COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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NEWSPAPER

There's a computer on board this spacecraft — and it's doing just what it wants to do.

System On Board Voyager Takes Its Cue From '2001'

By Ann Dooley
CW Staff

PASADENA, Calif — Much like HAL — the computer in the film '2001, A Space Odyssey' — the National Aeronautics and Space Administration's (Nasa) computer on board the Voyager II unmanned spacecraft decided it knew better than its human operators.

Last week the computer took over control of the ship headed for Jupiter and beyond and refused orders from scientists at ground control. It did not respond to human command because it was 'trying to protect itself' from a 'rough ride,' a spokesman explained.

The problem occurred when the Voyager II did not follow directions from the command center and failed to order a maneuver to check the position of a science boom on board the craft, the spokesman said. Instead, the computer cancelled the maneuver and returned the craft to its previous status.

The command was to have removed the dust cover from instruments at the end of the boom and at the same time to have spun the craft on its axis, the spokesman said.

The computer's failure to maneuver caused all activity to terminate while it waited for further information from the ground.

It took scientists back on Earth

(Continued on Page 4)

Document Reveals Bell Plans Packet Network

By Ronald A. Frank
CW Staff

NEW YORK — AT&T's upcoming answer to public packet networks will be a nationwide network handling 'various protocols.'

Slated to be called the Bell Data Network (BDN), the offering will include communications processing services and network management capabilities, according to preliminary specifications obtained from an industry source.

Announcement of a network that would allow the Bell System to compete with the public packet networks emerging around the world has been expected for some time. The AT&T network would compete with the packet network operated by Telenet Communications Corp. in this country.

Communications services to be provided by the BDN include 'communications processing functions' such as data entry, inquiry/response, remote job entry and message distribution, according to the AT&T specifications. These functions can be customized by BDN customers using a high-level programming language called Feature Definition Language (FDL), according to the AT&T document, dated November 1976 and called a 'Service Offering Statement.'

Processing in Nodes

Implementation of the processing functions will be 'provided for' in storage areas of the BDN nodes. Each node will include general-purpose storage for data accumulation and a 'communications processor'' to execute a user's FDL instruction set, according to the Bell document.

The BDN will include as an integral part of its structure ''many of the communications-oriented functions now being performed by the customer's on-premise hardware and software.

The AT&T specifications for the BDN do not use the term ''packet switching,' but they do state that the unit of volume selected for transmission is the 'kilopacket,'' which was described as 1,000 packets each containing 100 characters. The Service Offering Statement did not list proposed rates for BDN services.

The BDN will connect terminals to terminals, terminals to hosts, or hosts to hosts on a 24-hour, seven day per week basis. Two service grades will be provided for data transmission — standard grade and priority grade.

Each grade of service has several ''delivery options.' Once a user selects the grade of service desired, billing is computed on the basis of transmission volume 'without regard to the amount of time for transmission or to the distance traversed,' according to the BDN document.

Within the priority service designa-

(Continued on Page 2)

Nations to Debate Conflicts In Transborder Data Flow

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Are European governments using the privacy issue to drive U.S. companies out of the international data base and telecommunications markets?

This issue and a host of others concerned with transborder data flow will be the subject of an international meeting in Vienna, Austria, from Sept. 20-23 sponsored by the Organization for Economic Cooperation and Development (OECD).

As many as six European nations have passed or are considering laws ostensibly to protect the confidentiality of data about their citizens which companies operating within their borders are sending to other nations to process.

These nations fear that growth of information technology outside their borders poses a threat to their national sovereignty. A country whose data files are located in other nations is more vulnerable in times of peace as well as war, according to G. Russell Pipe, a consultant to OECD's Computer and Privacy Studies unit.

Like Canada, European nations also fear technology within their own borders will be retarded if they routinely send data abroad for more sophisticated processing, Pipe said. (See related story on Page 9)

With the marriage of computer and communications technology, the U.S. has become the acknowledged leader and is rapidly becoming the 'backbone of all industrial activity in the Western world,' Pipe said.

(Continued on Page 4)

Calcomp Asks Directed Verdict Be Thrown Out

By Molly Upton
CW Staff

SAN FRANCISCO — California Computer Products, Inc. has filed an appeal asking the Ninth Circuit Court of Appeals here to reverse the directed verdict in its antitrust case against IBM and grant a new trial.

The Justice Department filed an amicus curiae, or 'friend of the court,' brief asking that at the very least Judge Ray McNichols, who directed that verdict, be ordered to indicate his reasons for doing so.

Regardless of whether he issues an opinion however, McNichols judg-

(Continued on Page 6)

Firm Charged With Using Program to Inflate Stock

By E. Drake Lundell Jr.
CW Staff

WASHINGTON, D.C. — Fisco, Inc., a Philadelphia-based auto insurance company, used a computer program to inflate its profits apparently to increase the value of its stock, according to a complaint filed here recently by the Securities and Exchange Commission (SEC).

In one day alone, the program — called ''clean' — canceled out almost $1 million in claims against the company, thereby allowing it to report higher earnings, the complaint charged.

Named along with the company in the charges was the firm's former vice-president for DP, Richard C. Mitchell, and five other former officials of the company.

Fisco, which has been 'essentially bankrupt' since the fraud was discovered when its books for 1973 were audited, and the six officers agreed to permanent injunctions enjoining them from violations of the antifraud and reporting provisions of the security laws on the same day the complaint was filed.

The 'clean' program was essentially very simple, according to SEC investigators.

In the normal course of events, an insurance company sets up certain re-

(Continued on Page 3)

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Document Reveals AT&T Plans Network Offering Data Entry, Inquiry/Response

(Continued from Page 1)

tion, three levels can be selected. Priority 1 assures end-to-end transmission in a maximum of 200 msec; Priority 2 assures transmission in 15 sec; and Priority 3 assures transmission in a maximum of 30 minutes.

The standard grade of service will provide for end-to-end transmission of data in a maximum of four hours.

Within the four transmission service grades proposed for the BDN, three transmission delivery options will be available. These designations will be known as "standard," "deliver when authorized" and "timed delivery."

"Standard delivery" means data is transmitted directly to the addressed terminal or host CPU. If the destination device is busy or off-line, the message is held at the serving BDN node. Attempts to deliver are made at one second intervals.

"Deliver when authorized" means data is sent to the BDN destination node and held in the user's general-purpose storage until the terminal or CPU requests it.

Under the timed delivery option, data is delivered at the destination node at the time of day specified by the user.

Local Nodes

Terminals and computers using BDN facilities will terminate at a communications port at a local BDN node. Such BDN node ports, according to the AT&T specifications, will be similar in functions to ports found on communications front-end processors.

The BDN service will include access charges that cover transmission between the user's premises and the BDN node. Terminations at a node will depend on the equipment which the user has attached to the access line.

Port accesses at a BDN node will be configured to support "specific digital communications protocols, equipment and, in some cases, specific software packages," according to the BDN specifications. From the user's standpoint, the BDN node appears to be a "compatible pseudoprocessor."

The network emulates host processor acknowledgments of received transmissions, but this is meant to signify only that data is "properly received" by the network and not by the host CPU or terminal.

According to the BDN document, users will be able to mix equipment used on the BDN network, with ports designed to accept each type of terminal in the user's net.

Several types of device control are described in the BDN specifications. IBM asynchronous Ebcdic line control will be available to support the IBM 2740 Model 2, Data Measurements Model DMS 442-2, Diablo 1550, Memorex Model 1242 and Telex Terminal Communications Model TC 241 terminals "when equipped with features and options compatible with the 2740-2," the Bell document said.

The asynchronous Ebcdic control will support only polled devices, with each device being polled every 500 msec. BDN access for this line control will require a Bell 202 data set or equivalent unit with 30 msec line turnaround delay. This BDN access will be a four-wire half-duplex facility with continuous transmit carrier, the specifications said.

Access Arrangements

Three access arrangements will be provided under this Ebcdic line control — dedicated, outward dial and shared usage. Dedicated access can include two to 20 terminals as long as the terminals are all on the same premises. This type of access includes a dedicated private line between the BDN node and the user's premises, the AT&T specification said.

Outward dial access uses the dial-up phone network to access a terminal with BDN-compatible autoanswer features. The packet service will provide both dedicated and "shared dial" access port.

The third access arrangement available under the Ebcdic line control will be a shared, multiuser, multidrop line. This arrangement will be limited to Priority 3 and standard grades of transmission because of multiple users sharing a single BDN node.

The Ebcdic line control will support terminals operating at 300-, 600-, 1,200-and 2,000 bit/sec. Terminals with buffer storage ranging from 512- to 5,000 characters will be supported. The user must specify the terminal speed and buffer size, the BDN document said.

BDN will also provide the asynchronous Teletype line control used in the Model 33 and the Model 35 terminals. Teleprinters supported under this feature will be the Anderson Jacobson AJ630, General Electric Terminet line, Teletype models 33, 35, 37 and 43 and Texas Instruments TI 733.

CRTs supported include the Hazeltine 2000 and the Teletype Model 40 (Dataspeed 40) models 1, 2 and 3.

The Teletype line control will provide half-duplex asynchronous transmission, Ascii code, dedicated dial access and shared dial access of 110- and 1,200 bit/sec. With this offering, only dial-up access ports will be available, so terminals will have to be equipped with compatible autoanswer dial capabilities, the specifications said.

The AT&T document listed Binary Synchronous access as a third method, but gave no details on its implementation.

Packaged Services

The FDL will allow users to define and tailor their business needs into communications services. In addition, BDN will provide "common user software communications packages" for a monthly fee. These packages will be written in FDL and can be modified by BDN users. User-modified packages will have to be submitted to the BDN Customer Software Support Center for "validation."

The center will test "all customer-written or altered FDL programs to ensure they do not impact other users or network operations."

The four packaged services available on BDN will be data entry, transaction, storage administration and terminal/host addressing. These were described as communications services in the Bell document.

Asked for a comment on BDN, an AT&T spokesman said the company could not comment on services which had not yet been announced.

Any document being quoted with regard to unannounced services would be an internal document and contain proprietary information; in view of this, AT&T would not be able to answer specific questions, the spokesman said.

On the Inside This Week

NEWS

French Study Urges Independence From U.S. DP 5
Justice Brief Gives Interpretation of Sherman Act 6
Newspaper Hits U.S. Privacy Recommendations...... 9
Vermont Excludes DP Services From Sales Tax 11
GAO Reports Saga of DP Contract Overrun 13

EDITORIAL

Editorial: A Stretch, Not a Jump 14
Human Connection: Comments on Degrees, Jobs ... 15
Taylor Report: Who Should Set 'Duties' for DP? 15
The Strange Case of IBM 16

SOFTWARE & SERVICES

'CMF-Realtime' Documents CPE Trends 19
Needed Resources Cited in Curriculum Plan. 20
Package Shows Fortran Values 22

COMMUNICATIONS

Bell Planning Nationwide Net 23
Terminal Controller Allows Single-Line Addressing . . 28

SYSTEMS & PERIPHERALS

State Saves $12,000/Mo With OCR Units........... 29
'Ideal' DP Auditor Needs Range of Experience 30

MINIWORLD

Patients Enter Data Into Hospital's Mini 33
Datapro Offers Selection Course 36

MICROCOMPUTING

'Noisy' Electricity May Plague Hobbyists 37
Axiom Plotter/Printer Bows...................... 38

COMPUTER INDUSTRY

IBM Feared Competition to 360/30 CPU 39
1986 Mini, Micro Peripherals Mart Seen $37 Billion . . 39
Amdahl Stock Swings Up After IBM Announcement. . 41
Turkish DP Arena Found Sluggish, Growing 42
Range of Print Heads Announced................. 46

New NCR Upkeep Policy Riles Users, Dealers

By Toni Wiseman
CW Staff

DAYTON, Ohio — NCR Corp. has generated a ripple of concern in some corners and a furor in others with the rewriting of its maintenance policy.

The new policy "clarifies that NCR does not have an obligation to automatically continue on maintenance service units or systems sold directly from one user to another or through third-party marketing representatives," according to an NCR spokesman. "Any such representation by anyone will not be supported by NCR."

All equipment sold by anyone other than NCR will now be inspected prior to approval for maintenance services. Such inspection was previously required only if the equipment had been out of service for more than 60 days, the spokesman explained.

The new policy, according to NCR, is a "tightening, extension and clarification of language differences and emphasis" in its previous policy. It was also designed "to clear up certain areas where nothing was said before," the spokesman stated, noting that "what is written policy and what is practiced is sometimes a little different."

NCR's opinion is that users are "not up in arms about it, but are concerned about it," he said.

That concern was demonstrated by a series of weekend meetings between several users and NCR executives including Bob Gaines, NCR's vice-president for domestic maintenance.

Before the meetings, Charles Yahn, president of the Federation of NCR Users, said he was "optimistic that [NCR] will come around to what we feel we need." He was still optimistic after the meeting, when NCR guaranteed him it would alter some points and wording. Yahn hoped to have a final draft of the policy by last Friday.

Others, however, are more distraught about the situation. Guy Simo, president of Computer Enhancement Corp., a firm which takes NCR memory in trade for its product and resells it, charged the new policy causes the value of equipment to drop to zero.

This, he said, is because NCR "will not recertify for maintenance any equipment sold by anyone but NCR, including [intra-user] sales."

Simo discovered the policy change during sales negotiations with a customer in Middletown, Ohio. The policy, he said, had been drafted a month ago and was being issued to district offices.

"It is our contention that NCR would have issued this policy internally and would not have let the NCR users know of the policy change. Users would have found out about the changes on a selective basis when needed," Simo charged.

Policy Differences

The basic policy has remained pretty much the same, according to NCR, in that the company stipulates it will inspect equipment to see that it works correctly before it agrees to put the equipment on a maintenance contract. The wording of the earlier policy provides that the equipment qualifies for acceptance for maintenance after an inspection and any charges to the customer will be limited to certain items such as in-transit damage.

The new policy states NCR will install the equipment, make a thorough examination and do the work to put it into satisfactory condition. The cost of the services will be borne by the prospective user.

The old policy provided for payment on an hourly service rate; the new policy calls for a flat rate, he noted.

He said the new policy also contains general statements to the effect that "NCR's first obligation is to support its direct customers. Its field engineering division will support these direct customers and NCR's own marketing effort" before the efforts of others.

Firm Charged In Stock Scheme

(Continued from Page 1)

serves to cover claims against its policyholders. For example, if a policyholder has an accident and the insurance adjuster estimates the damages at $500, then a reserve of $500 is set aside to reimburse the policyholder after the car is repaired.

What the "Clean" program did was prohibit any increase in claims after they were filed. For example, it might later be found that someone was injured in the $500 accident and the claim might rise to $5,000. The adjusted would send in an updated claim for that amount, but the "clean" program would not register the additional $4,500 liability on the company's books.

In many cases the amounts of claims rise before they are finally settled, the investigators noted, adding that on one day called "Black Friday" in the complaint the "clean" system wiped $1 million off Fisco's liabilities.

Because Fisco was not reporting all of its liabilities, its earnings picture looked better than it actually was, the complaint noted. While the program was in operation limiting Fisco's liabilities, the firm was reporting earnings increases of over 100% per year — and this boosted the firm's stock to a high of $36 per share, SEC indicated.

However, when the fraud was uncovered, the firm, which at one time had written $57 million of insurance, had a loss of $39 million in 1973.

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Meeting Set to Cover Transborder Data Flow

(Continued from Page 1)

Concern for these issues has produced the movement in Europe to protect national sovereignty, minimize vulnerability and consolidate technical achievements through national privacy laws and international agreements. Some U.S. officials even fear development of a "data cartel," sources said.

Most U.S. officials who will be represented at the Vienna meeting hope reciprocal agreements on the protection of data "can be worked out," sources said.

As early as 1975, the Nordic Council, involving Denmark, Finland, Norway and Sweden, established a working group to harmonize national privacy laws and to consider an international agreement on data flows within Scandinavia and to other countries. Several other European nations, notably France and Germany, are also moving in this direction.

Members of the European Economic Community (EEC) are also working to resolve differences among themselves. However, the EEC's commitment to a common DP policy and economic concerns may make any eventual agreement broader, Pipe noted.

U.S. Slow to Organize

U.S. business leaders believe an open, competitive market in which data base producers and distributors can provide their goods and services is the approach best suited to its interests, several industry leaders said.

However, they have been slow to organize to present a common front at the upcoming international symposium. Serious U.S. consideration of the issues surrounding transnational data flows has only come this year.

An interagency task force has been established within the U.S. government, consisting of 16 members from seven federal agencies. The group is chaired by Dr. Oswald Ganley, deputy assistant secretary for advanced and applied technology affairs at the State Department here.

But the six months work it has planned for itself has yet to be done. "The U.S. is late, and doesn't have an industry advisory committee set up yet," according to Brendon McShane, a consulting specialist with General Electric Co. "We are walking into an international symposium without a position. We are going to get killed."

Others in industry — chiefly the Computer and Business Equipment Manufacturers Association (Cbema) and the Information Industry Association (IIA) — have held meetings and drafted speeches for the international conference or will send representatives to Vienna this month, according to Cbema's vice-president Oliver Smoot.

IIA President Paul G. Zurkowski said his members have concluded harm is already being done to American information services in Europe through surcharges imposed on European users of U.S. goods by the public telephone and telegraph (PTT) authorities in these countries.

"While PTT recognition of the value of information is keeping the door open slightly for U.S. information services, other monolithic monopolies (such as the proposed Euronet) are being created which could foreclose European markets to U.S. services entirely," Zurkowski concluded after a July IIA meeting.

Like Carole Parsons, the executive director of the Privacy Protection Study Commission, Smoot doesn't believe the laws on privacy have to be the same in every country in order for international society to function. Parsons will go to Vienna to explain to the symposium the direction U.S. privacy laws will take if the commission's recommendations are adopted by Congress and the President.

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System Takes Over Voyager

(Continued from Page 1)

several days to understand why the computer was acting the way it was. The delay in finding a solution was caused by the "complexity of interfaces of software and on-board computers," the spokesman said.

First of Two Craft

The Voyager mission is designed to explore Jupiter and Saturn and their satellites. There is also the possibility the second probe might go to Uranus or even beyond.

The second Voyager, called Voyager I because it will reach Jupiter first by a faster route, is now scheduled for liftoff on Sept. 6. Its first scheduled liftoff was delayed for a few minor adjustments, one of which was to install two new springs on the boom system, since scientists thought for a while that the problem was mechanical rather than communications related.

The on-board computers, designed by the Jet Propulsion Laboratory (JPL) for Nasa, are programmed for a greater degree of self-care than ever before and can also direct many of the subsystems on the ship.

In addition, the software can be reconfigured to meet changes as they occur, according to a JPL spokesman.

Ambitious Attempt

This is the most ambitious attempt by Nasa to explore the solar system in an effort which is expected to cost more than $400 million, according to sources. A total of 85 scientists incorporated in 11 science teams are working on the project, a spokesman said.

The instruments on board will gather information from the planets and satellites including data on how they interact with solar wind, atmospheric motions, different types of atmosphere, hydrogen clouds and satellites' orbits.

In addition to telling about a particular planet's conditions, the data might aid in discovering the evolution of the planetary system, a spokesman said.

The two Voyagers will transmit pictures and data using cameras and scientific sensors as well as electronic communication devices.

Fresh Energy

The two spacecraft will get a new charge of energy going from Jupiter to Saturn. Through careful targeting, the two craft will be pulled into the planet's gravity and then sent out at higher velocity to the next targeted course, a spokesman said.

The first spacecraft, which was launched Aug. 20, is following a high-trajectory course which will cause it to take longer to reach Jupiter than the second spacecraft which is scheduled for liftoff on Sept. 6.

The first spacecraft launched will arrive at Jupiter around July 1979; the second spacecraft will arrive three months earlier, in March.

Because of the great distances involved in the interplanetary mission, a 12-foot-wide disk antenna, the largest ever used, was installed in the Voyagers. But even with this improvement, communication by radio signal from Jupiter to Earth will take 45 minutes.

This long communication delay required advanced electronic equipment so the craft can be more independent from earth-based control, a spokesman said.

Commands to the spacecraft are transmitted from an IBM 360/75 in the center to deep space stations around the world and then to the space craft.

Down Link Telemetry

The down-link telemetry also goes through the deep space stations by cable or satellite links to a Univac 1108.. The telemetry is processed and then displayed on CRTs at the center.

The data is recorded on tape to be processed later on an IBM 360/75 for charts and plots.

There are six custom-designed onboard computers on each Voyager, two which control altitude computer command, two for the ground system and two for the flight data subsystem which performs the formatting and downlinking, a spokesman said.

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By G. Russell Pipe
Special to CW

PARIS — "Is it necessary that all models used to prepare monthly or quarterly forecasts of European economic trends have to be designed in the U.S. and disseminated to Europe via networks belonging to American firms?"

A recent report published by the Ministry of Industry and Research here asked this question as it explored the means currently available to amass sufficient data, tools of analysis and dissemination that could bring self-sufficiency in French planning strategy.

In a frank review of French planners' dependence on U.S. data resources and processing methods, J.M. Treille proposed "The Tools for Economic and Industrial Strategies." "The most efficient econometric tools and their suppliers are to be found exclusively in the U.S., from such services as Data Resources, Inc. (DRI), distributed in France by Tymshare; Chase Manhattan Econometrics; and General Electric Mapcast," Treille said.

American organizations such as the National Bureau for Economic Research, the University of Maryland Inforum model and MIT's mathematical model of economic behavior are the best sources of "economic software" for France, he added.

Despite the availability of basic economic indicators and statistics from the Organization for Economic Cooperation and Development (OECD) and the International Monetary Funds, as well as sources such as the United Nations and World Bank, the "monopoly of tools needed for basing modern national economic analysis are on American informatics networks." Today it is easier to process and interpret data from OECD in France on the DP nework of DRI than the French statistical institute Insee, "which has the data but cannot organize [it] for sufficient accessibility by users."

Interference Feared

Dependency on a foreign power for crucial information resources is at the root of French concern. This is indicated by Treille's "basic questions about the monopoly situation:

"Will the control of the tools and data lead to imposing hypotheses, results and thereby indirectly to policy choices?

"Will all these resources be accessible without regard to French data processing or telecommunications policies?"

And, striking a somewhat political tone, he asked: "Aren't the European economists capable of developing research systems for economic decision-making without injuring cooperation with the U.S.?"

How can this condition be reversed? Treille called first for a mastery of the models, software and integration of data sources by:

- Reducing the use of American networks.
- Improving European supplies of basic data and avoiding the American data banks.
- Initiating research into "reconstituting all or major parts of existing [American] data bases on a continuing basis."
- Constructing more suitable, flexible models by departing from classical approaches to economic analysis.

The econometric service market is largely American, Treille noted, so U.S. commercial networks have become highly sophisticated in organizing the necessary data, creating models and software to effectively prepare economic indicators and industrial planning information.

Europe, on the contrary, is less developed because of lack of demand for such services and absence of a commitment to such an effort, he indicated.

Another factor is that "dynamic data" in American systems is much more readily available than statistical information which the user can obtain directly from European sources. The American data is easily accessible in a form for conversion and treatment; it can be retrieved soon after events or time periods have passed.

Indigenous Industry

The study was a two-year effort designed to present and analyze sources of French economic and industrial data and indicate where the French government and others in Europe may begin an indigenous program. It essentially tells French officials to take a cue from American enterprise and gear up and perform economic analyses by building their own capabilties.

The French abhorrence of foreign dependency is very much present; the emphasis is on what the country must do for itself. Such developments as a national public data network, the Euronet system for exchange of information and even the move by postal, telegraph and telephone authorities to crowd private networks through volume-sensitive pricing seem to indicate that protectionist policies are in the wind.

It seems in the short run, however, that the French cannot restrict the present services because there is no real domestic capability to put in their place.

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Justice Brief Gives Interpretation of Antitrust

By Molly Upton
CW Staff

SAN FRANCISCO — What constitutes a violation of Section 2 of the Sherman Antitrust Act?

With directed verdicts issued in the antitrust cases brought against IBM by California Computer Products, Inc. and by Greyhound Computer Corp. — and with a reversal of the ruling in the latter case — many observers are asking that question.

The Justice Department outlined its version of what a plaintiff needs to demonstrate in order to prove monopolization in violation of Section 2 of the Sherman Act. The description was contained in a friend-of-the-court brief filed in support of the Calcomp motion asking the Ninth Circuit Court of Appeals here to overturn Judge Ray McNichols' directed verdict and to order a new trial (see story on Page 1).

"Monopoly power is the power to control prices or exclude competition," Justice stated.

The plaintiff must prove both that the defendant possessed monopoly power in a relevant market and that it engaged in conduct with the purpose or intent of exercising that power, according to Justice. However, "proof of a specific intent to monopolize is not required."

This "requisite purpose or intent can be established by examining the defendant's business practices to see if they were designed to acquire or maintain monopoly power or had that effect . . .

"Where a company possessing monopoly power engages in business practices which, though not unlawful in their own right, are more restrictive than necessary on competition in the relevant market, the trier of fact can infer from such conduct that the company acted with the purpose or intent to exercise monopoly power," Justice said.

Thus one does not need to prove the defendant's business policies were "predatory."

The plaintiff need not prove the defendant obtained or maintained his monopoly power through restraints of trade that are illegal under Section 1 of the Sherman Act, Justice said. Such proof, however, would in itself be sufficient to prove the defendant had acted with the purpose or intent of exercising monopoly power.

To determine whether a defendant possesses monopoly power, "the finder of fact must evaluate a number of facts including the structure of the market, the market shares of the companies in the market, the entry barriers into the market and the behavior of firms in the market," Justice indicated.

The determination of whether a firm has a monopoly share in a market should be left to the jury if sufficient statistical evidence is given indicating a company possesses a very large share of a relevant market, the brief stated.

Also, "the issue of whether a defendant has acted with 'the purpose or intent to exercise' monopoly power is largely a factual question which can only be resolved by examining the totality of the defendant's activities and the impact of those activities."

Calcomp Appeals Verdict in IBM Lawsuit

(Continued from Page 1)

ment should be reversed if he did not apply the proper standards in considering IBM's motion for dismissal of Calcomp vs. IBM, according to the brief filed by John H. Shenefield, acting assistant attorney general.

The moves followed closely on the heels of a decision by the same Appeals Court to overturn a lower court's direted verdict and order back to trial the antitrust case of Greyhound Computer Corp. vs. IBM [CW, Aug. 29].

Mindful of the three years and four months the Ninth Circuit took to consider the Greyhound case, Calcomp also petitioned for an expedited hearing.

One Overriding Question

The Calcomp brief observed that the "dispute involves a singular, overriding question of the law: may an alleged monopolist, in reacting to competitors challenging its monopoly position, engage in conduct which is either calculated to or will inevitably operate to effectively eliminate them?"

McNichols apparently agreed Calcomp had established sufficient evidence to permit a jury to decide whether IBM had monopoly power in one or more properly defined "relevant markets," Calcomp indicated.

"The crucial question dispositive of this litigation," Calcomp said, "is whether the acts and practices of IBM in preserving that position constitute a violation of either the monopolization or attempt to monopolize clauses of Section 2 of the Sherman Act, or both."

In addition to citing evidence supporting Calcomp's contentions regarding market share, the brief detailed those steps by which IBM "deliberately sought to preserve its monopoly power by suppressing competitors."

Department Concerned

The Justice Department, in its friend-of-the-court brief, indicated that private antitrust actions play an "important supplemental role" in the enforcement of antitrust laws and frequently involve significant issues of antitrust policy.

Thus, the department said, it is "concerned that the district court did not apply the proper legal standards in considering the motion.

"Summary procedures, such as motions for directed verdicts, are rarely appropriate in antitrust cases because of the complexity of most such litigation and because motive and intent are, in many cases, among the several significant issues which only the trier of fact can resolve," Justice said.

Because McNichols did not explain his decision, it is possible the decision was based on an erroneous view of Section 2 of the Sherman Act, according to the Justice brief.

Justice argued that since Calcomp had apparently established relevant markets to McNichols' satisfaction, it was up to the jury to decide the other two issues — whether IBM possessed monopoly power and whether it had "the purpose or intent to exercise that power."

"These issues, however, are inherently factual in nature and must generally be resolved by the jury after receiving appropriate instructions from the court," Justice said.

Statistical evidence may constitute prima facie proof of monopoly power in a market, but the exact percentage of market share varies from case to case depending on the relevant market, Justice continued.

"Since Calcomp presented evidence indicating that IBM possessed a very large market share, it apparently presented sufficient evidence to send this issue to the jury — assuming Calcomp's evidence was not so inherently unreliable that no reasonable juror could have believed it," Justice stated.

"Logically, therefore, the district judge could not have directed a verdict because of a failure of proof on this issue without improperly weighing the evidence of substituting its judgment for that of the jury."

Observing that business practices that are legal for a nonmonopolistic firm may be illegal for a monopolistic entity, the Justice Department said a jury could have inferred from IBM's conduct that it acted "with the purpose or intent to exercise monopoly power if its business practices were more restrictive than necessary on competition in a relevant market."

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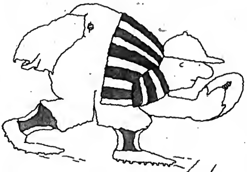

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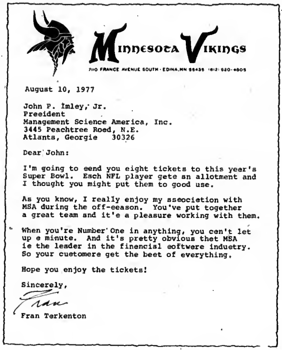

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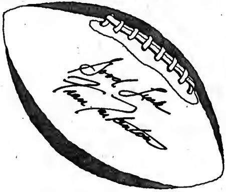

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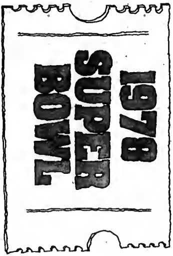

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Dutch Find Them Contradictory

Newspaper Hits U.S. Privacy Recommendations

By Nancy French
CW Staff

ROTTERDAM, The Netherlands — The European business community is apparently troubled by the way the U.S. Privacy Protection Study Commission has proposed to deal with personal privacy in the world of recordkeeping, judging from an editorial in the *NRC Handelsblad* here recently.

Holland's national financial daily newspaper, considered equivalent to the *Wall Street Journal* in the U.S., called the commission's analysis "impressive," but found its recommendations "fragmented" and "contradictory" in some fundamental respects.

The commission's report indicates "Europe and the U.S. are in danger of each going their own way in protecting privacy" in recordkeeping, the editorial said.

Going separate ways could have a serious impact on data which now flows from country to country as part of international business.

Cited as contradictory was the commission's assertion that it wants those that maintain the data to spend their money on improving their record systems, rather than on expensive court cases. However, the commission's recommendations place all the responsibility for assuring they have improved their systems on the individual data subject.

It is the individual who will have to go to court with his complaints, the editorial pointed out.

Further, "the American report acknowledges that the individual approach to the privacy problem cannot be expected to solve the more systematic aspects such as bureaucracy.

"Indeed, one cannot expect from individual complaints and court cases that they will produce 'people-oriented computer systems,' as it is called in the jargon. To further this, one needs policy initiatives [but] the proposed, semisoft Privacy Board lacks the weight even for that," the editorial charged.

The American commission reached its conclusions without even mentioning European legislative initiatives. "Data traffic between the U.S. and Europe has been called, with good reason even now, the lifeblood of many multinational companies. This is the trend; data transmission is the future.

"That the American business community has succeeded to block penetrating privacy regulation for the private sector can be called a Phyrhic victory. Of course, harmonizing the privacy initiatives within Europe promises to be quite a problem. The German Bundesdatenschutzesetz that was published in February was weaker than the Swedish Data Act of 1973, and now Denmark has published its own 'mild' variety.

"But these diverging European bills at least put a bottom line in the market where the American commission leaves holes," the editorial said. "It is inevitable that European governments will conclude that reciprocity in the protection of personal data traffic . . . is not sufficiently guaranteed.

"Canada has experienced this already from the U.S. From these suspicions to restrictive measures is only a step."

Norwegian Privacy Bill Seeks Licensing

By G. Russell Pipe
Special to CW

OSLO, Norway — The government here has proposed a privacy law that calls for licensing DP installations that handle personal data in both the government and private sectors.

The law, which will be considered by Parliament later this year, gives personal information a broad definition, applying it to identifiable individuals, organizations or foundations.

A rule of relevance to user needs is applied, except that information on race, politics or religious convictions, suspected criminal activity, trial or conviction, health, drug abuse, sex habits and family affairs may not be collected without clear justification.

A control board of seven members will be responsible for monitoring general developments in personal record keeping, advising organizations of ways to improve their practices. It will conduct inspections and maintain a register of all licensed systems.

Licensing would be required of most DP operations handling personal data, specifically those holding sensitive data. Also licensed are agencies that provide credit references, direct mail firms and opinion survey companies.

Applications for licenses will require information assuring compliance with:

- Collection and control requirements;
- Processing and storage procedures;
- Linkage to other personal files;
- Secondary use or transmission to other systems;
- Availability of data to person registered; and
- Right of individuals to demand inspection.

A penalty of up to one year imprisonment has been proposed for violations.

Foreseeing a Scandinavian harmonization of data protection legislation, the Norwegian bill provides that some requirements affecting export of personal data can be waived for certain qualifying countries.

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Sept. 27-29, San Juan, Puerto Rico — **Civil Engineering Program Applications.** Contact: Cepa, P.O. Box 1532, Rockville, Md. 20850.

Sept. 27-29, Snowbird, Utah — **Fifth Data Communications Symposium,** sponsored by the Association for Computing Machinery and the Institute of Electrical and Electronics Engineers. Contact: Gene D. Hodge, IBM Corp., Gaithersburgh, Md. 20760.

Sept. 27-29, Washington, D.C. — **National Micrographics Association (NMA) and International Micrographic Midyear Meeting.** Contact: NMA, 8728 Colesville Road, Silver Spring, Md. 20910.

Oct. 2-5, Houston — **22nd Annual Conference of the Association of Records Managers and Administrators (Arma).** Contact: Arma National Office, P.O. Box 281, Bradford, R.I. 02808.

Oct. 2-6, Los Angeles — **1977 Annual Meeting of the Industry Applications Society,** sponsored by the Institute of Electrical and Electronics Engineers (iEEE). Contact: Los Angeles Council, IEEE Business Office, Suite 410, 999 N. Sepulveda Blvd., El Segundo, Calif. 90245.

Oct. 3-4, Washington, D.C. — **Task Master Users Group Fall Meeting.** Contact: Hans Hansen, Task Master Users Group, Inc., P.O. Box 866, Norwalk, Conn. 06856.

Oct. 3-5, Washington, D.C. — **First Annual Symposium on Computer Applications in Medical Care.** Contact: Abund Wist, Virginia Commonwealth University Medical College of Virginia, MCV Station, P.O. Box 16, Richmond, Va. 23298.

Oct. 3-5, Chicago — **First Annual Users and Coordinators Conference**, sponsored by SPSS, Inc. Contact: ViAnn Beadle, SPSS Technical Adviser and Conference Coordinator, Suite 1234, 111 E. Wacker Drive, Chicago, Il. 60601.

Oct. 3-6, W. Lafayette, Ind. — **Fifth Annual Meeting of the International Purdue Workshop on Industrial Computer Systems.** Contact: Prof. T.J. Williams, Chairman, Purdue Laboratory for Applied Industrial Control, Purdue University, W. Lafayette, Ind. 47907.

Oct. 4, Los Angeles — **Western Systems Conference,** sponsored by Association for Systems Managment, Contact: Larry Muich, General Chairman, Price, Waterhouse and Co., 606 S. Olive, Los Angeles, Calif. 90017.

Oct, 4-6, Moffett Field, Calif. — **Workshop on Future Computer Requirements for Computational Aerodynamics**, sponsored by the National Aeronautics and Space Administration (Nasa). Contact: Dr. F.R. Bailey, Mail Stop 202-1, Nasa Ames Research Center, Moffett Field, Calif. 94035.

Oct. 4-6, London — **Datafair 77**, sponsored by the British Computer Society, Contact: Ruth Rees, OYEZ-IBC Ltd., Norwich House, Norwich St., London EC4A 1AB, England.

Oct. 4-6, Providence, R.I. — **Designing, Developing and Operating Teleprocessing Systems.** Contact: College of Business Administration, University of Rhode Island, Kingston, R.I. 02881.

Oct. 5-7, Port Chester, N.Y. — **Information Industry Association (IIA) Annual Meeting: "Coping With Growth in the Information Business."** Contact: IIA, Suite 904, 4720 Montgomery Lane, Bethesda, Md. 20014.

Oct. 6-7, Dallas — **Conference on Supermarket Electric Funds Transfer Services,** cosponsored by Bank Administration Institute (BAI) and Food Marketing Institute. Contact: BAI Registrar, P.O. Box 500, Park Ridge, Ill. 60068.

Oct. 9-11, San Francisco — **Fall Meeting of the Association of Information and Dissemination Centers (Asidic).** Contact: Asidic, P.O. Box 8105, Athens, Ga. 30603.

Oct. 9-12, Washington, D.C. — **Info/Expo '77,** sponsored by the Data Processing Management Association (DPMA). Contact: DMPA, 505 Busse Highway, Park Ridge, Ill. 60068.

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Vermont Excludes DP Services From Sales Tax

By Nancy French
CW Staff

Protestations against taxing computer and DP services have begun to pay off in three more states, including Vermont, Missouri and Tennessee.

The Vermont legislature has amended the definition of a taxable sale set forth in the Vermont sales and use tax law to exclude "computer and data processing services where tangible personal property is transferred as part of such a service transaction." The exemption applies as long as "no separate charge is made for the tangible personal property and so long as the value of the tangible personal property transferred is essentially an inconsequential element in relation to the value of the service transaction."

The amendment went into effect July 1, 1977, but the law provides that the amendment will be applied retroactively if such treatment is to the benefit of the taxpayer.

The new provision would be applicable to firms engaged in batch processing services, acording to Sanford H. Goldberg and Arnold B. Tanzer, both of Roberts and Holland in New York.

Their opinion was expressed in the July issue of the Association of Data Processing Service Organizations' *Tax Newsletter*.

Some Areas Unclear

The conclusion is not so clear in the area of time-sharing, since the wording of the statute does not resolve the issue of whether time-sharing should be viewed as a DP service or merely as a license to use tangible property, the two attorneys indicated.

The extent to which the statute applies to contract programming and keypunching is also uncertain, they said.

Robert M. Sherin, a non-judicial legislative counsel to the Data Processing Management Association (DPMA), disagrees with the Goldberg-Tanzer opinion on programming and DP services.

According to Sherin, "the law acknowledges the broad profession of software and DP services that has been recognized in a number of court decisions handed down recently. As such, both should be included under the law."

While a similar law was passed by the Ohio state legislature last year, the issue is still being fought on a number of fronts, including New York.

A temporary moratorium on software taxes there [CW, Aug. 29] has provided some short-term relief, but the issue has not yet been resolved.

In Missouri, the Department of Revenue amended its sales tax regulation on computer printouts making them nontaxable. The amendment also provides some refunds for companies that previously paid such taxes.

Meanwhile, in Tennessee, the battle against software taxation is still alive, but the class action suit brought by Sherin, president of Nova Computing Services, Inc. of Miami, is in need of support, according to Sherin.

The Federal District Court for the Middle District of Tennessee denied the state's motion to dismiss the class-action suit filed by Sherin [CW, Aug. 8] and ordered the state to answer a motion for summary judgment.

But the court also gave Sherin until the beginning of September to prove that his suit is really a class action.

Sherin indicated the action needs the support of a person, firm or association that is "substantially affected" by the Tennessee legislation.

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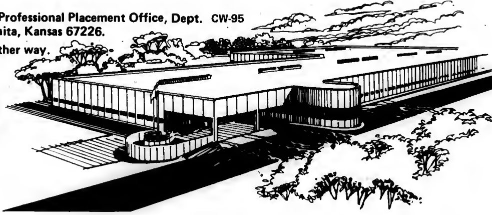

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GAO Reports Saga of DP Contract Overrun

By Molly Upton
CW Staff

WASHINGTON, D.C. — When does a $378,000, nine-month contract become a $2 million plus, 44-month contract for a system that was never completed and barely used?

Or, as the General Accounting Office (GAO) seems to be asking, at what point should a contracting agency know it is "throwing good money after bad"?

A report by the GAO details the saga of an award by the Department of Health, Education and Welfare's (HEW) Office of Education (OE) to the North American Rockwell Corp., now Rockwell International.

The award was for the Project Grant Information System, which was to have helped OE management plan and select new projects; award and control grants; and administer programs and individual projects. The system was also intended to control and forecast program budgets and obtain information on educational trends.

The proposal for the system was submitted "unsolicited" by Rockwell and awarded on a sole-source basis. Rockwell essentially proposed an expanded design of a system it had previously designed for OE.

The contract was awarded in October 1969 for a system that was to have been operational by July 1970 at a total cost plus fixed fee of $378,147.

As of June 1973, however, the price was up to $2.2 million and another $842,000 in costs brought the price tag to over $3 million.

The award was terminated before Rockwell completed all the work it was to have accomplished, the GAO indicated, and in March 1974 the OE abandoned the system, citing unreliability and a high cost of operation.

The OE later prepared a less sophisticated system for about $20,000 that it said met the needs that were to be filled by a simplified version of Rockwell's system. However, Rockwell indicated in the GAO report that this system utilized the data base it had prepared.

Both to Blame

The GAO report, "History of a contract Awarded to Develop a Project Grant Information System," prepared at the behest of Sen. William Proxmire (D-Wis.), exonerates neither party.

The contract "grew because of poor Office of Education management and poor contractor performance. The [OE] did not take strong action to make certain that the contractor would complete work on time and within the contract price," the GAO found.

"Frequent changes in responsibility for the contract within the [OE] also hindered its capability to manage the contract," the GAO said.

Responsibility for administering the contract was assigned to five OE project officers and three organizational entities during the contract period, the report said.

Rockwell also changed personnel. Two months after the contract was awarded, the firm had its third project team on the job. The OE project officer said the second and third teams lacked the expertise to perform the task outlined in the contract.

Rockwell, it said, wanted to make some changes in the system because it lacked the expertise to do the work as originally agreed, the GAO report indicated.

Although several OE officials expressed reservations about the system before the contract, the OE approved 16 modifications.

Didn't Observe Rules

The OE "should have placed greater emphasis on criteria outlined in Federal Procurement Regulations requiring consideration of past contractor performance in determining contract fees, including those on contract modifications," the GAO said.

Rockwell had difficulty delivering products which met with OE approval, yet the awards continued. For instance, Rockwell failed to submit all design documents to OE by mid-April 1970, and those that were submitted were judged unsatisfactory by OE, the GAO reported.

Also, the OE did not always comply with the Federal Procurement Regulations and "circumvented [OE] internal procedures in administering this contract."

For example, after the Sole Source Board was formed to review requests over $25,000, the OE granted a $32,000 extension of the contract without submitting it to the board.

In other instances, the contractor worked without a contract because the OE did not approve extensions promptly, GAO indicated.

On the first major extension of the project, the GAO could find no evidence that officials involved in the project had reviewed Rockwell's proposal before the contracting officer made the award.

Although the OE handled the proposal as unsolicited, it was actually a follow-on effort to earlier contract work. "As such, it did not meet OE criteria for an unsolicited proposal," the GAO said.

The saga outlined in the GAO report includes details such as OE's knowledge that Rockwell would assign personnel unfamiliar with the earlier system.

The scope of the project was reduced after the contract price had reached $1.8 million about two years after the original completion date.

"OE officials told us they had found the system as previously proposed too complex. It required too much data preparation and input and provided reports OE management did not use," the GAO stated.

The GAO observed that "because the available contract documents did not always delineate the costs of individual tasks to be performed in each proposal, we could not determine the amount of funds awarded to cover cost overruns vs. increases in the contractor's scope of work nor whether the overruns were the fault of OE or the contractor."

A review of the unfinished simplified system by an outside firm indicated the programs ranged from "barely adequate" to "useless."

HEW Tightens Controls After Learning Its Lesson

By Molly Upton
CW Staff

WASHINGTON, D.C. — Calling the Project Grant Information System (PGIS) a "case study of a systems failure," the Department of Health, Education and Welfare (HEW) indicated it has learned its lesson.

The PGIS, commissioned by HEW's Office of Education (OE), mushroomed from a $378,000 contract to one of more than $2 million as both OE and the contractor, Rockwell International, attempted to arrive at a usable system.

Although many procedural changes recently made by HEW will prevent such a saga from recurring, the changes are not a direct outgrowth of the PGIS project, HEW said.

HEW has established an inventory of its systems and funding for a new system may not proceed until the developing agency within HEW registers it in the inventory.

HEW is about to initiate a long-range planning process for computerized systems which should "help ensure that the program managers, rather than the systems designers, take responsibility for systems resources," according to a report by the General Accounting Office.

Officials at all levels have been made more familiar with procedures to be used with sole-source contracts.

The contract justification and review procedure has been strengthened so stronger and more detailed justification is required before funds are allocated for new, extended or modified contracts, HEW said.

"The concept of PGIS was sound, but probably too large for HEW's state of the art at that time," HEW said. The system "attempted to do too much at one time.

As originally conceived, it would not only monitor discretionary grants, but also provide abstracting, indexing and cross-referencing capabilities. These attributes were (and are) desirable for such a system. Unfortunately, a similar system did not exist in OE at the time," HEW said.

"The size and complexity of the job undertaken was not adequately comprehended. There was an attempt made to design and put together a system that satisfied all sorts of management purposes," the agency added.

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Editorials

A Stretch, Not a Jump

There have been indications for some time that IBM's Systems Network Architecture (SNA) has not been an overwhelming success with users. And hesitancy about switching to SNA has been reported.

But now an industry consultant has predicted that major changes to the structure of SNA are slated within the next few years. According to Howard Frank, president of Network Analysis Corp., the price performance trade-offs of SNA are not well understood [CW, Aug. 15]. And since there is so little operating experience with the environment that SNA needs, there are few users that have seen fit to transform their existing networks.

It now seems IBM "preannounced" the SNA concept to achieve a marketing advantage with users who were on the threshold of making teleprocessing decisions. But users who considered the architecture, together with its required software and hardware upheaval, have found few benefits that have actually been proven in the field.

There is certainly no mass immigration to SNA. And if Frank is correct, it will take some hard performance statistics together with attractive costs to cause users to jump into this environment.

All this may leave IBM with few options other than a major rewrite of the SNA specifications. It may be that SNA was ahead of its time; it is also possible that SNA is actually a way to increase dependence on IBM products or that it is too complex for users to grasp.

Whatever the cause, users apparently will force IBM to make some major modifications in the near future.

In the meantime, there seem to be few users that cannot upgrade their networks within existing, more readily available data transmission options. The message here may be that it is better to stretch existing technology than to jump for the first brass ring that comes along.

No Retreat

A recent survey of minicomputer users showed there is still serious concern about the software support provided by minicomputer vendors [CW, Aug. 29]. About 25% of those surveyed said there is room for improvement in the software provided by their procssor vendor.

The mini business grew up as an "iron-only" area at first; only later did suppliers begin to provide operating system software and applications programs.

Perhaps in this context, software support problems can be excused because they are a relatively new development. But at the same time, vendors of this equipment are multiplying faster than in other segments of the computer industry. And this rapid growth (especially as evidenced by Digital Equipment Corp.) also incurs an obligation to give the user the best possible systems support available.

Part of the sales pitch for minis is that they can do certain jobs more effectively than the number crunchers which preceded them. If this promise is to be kept, there must be high-quality systems support.

The minis continue to offer users economies of scale over mainframes, but if they operate at less than achievable efficiency, they will — like many mainframes — be wasting processor power.

The mini makers have pledged to give users the systems support that is required. This is an ongoing commitment from which these vendors cannot and must not retreat.

Data Past

Five Years Ago
Sept. 6, 1972

WASHINGTON, D.C. — A study released by the General Accounting Office (GAO) revealed that computer performance evaluation techniques — both hardware and software — could increase the productivity and efficiency of computer systems. GAO found the use of such techniques resulted in government savings of 20% to 40% and therefore recommended their use be encouraged by the Office of Management and Budget for governmentwide use.

— — —

WASHINGTON, D.C. — A Nixon Administration-sponsored bill was introduced in the Senate by Sen. Roman Hruska (R-Neb.) to permit greater access to the records in the FBI's Computerized Criminal History data bank of arrest records. The bill, which proposed stricter penalties for misuse of the data, was introduced at the request of the Justice Department in response to a U.S. District Court decision that banned the dissemination of such files outside the U.S. government or local law enforcement agencies.

Eight Years Ago
Sept. 10, 1969

NEW YORK — Data Network Corp., user of Scientific Data Systems (SDS) 940 time-sharing system, sued SDS for $10 million in compensatory damages and $1 million in punitive damages. The suit, filed in federal district court here, charged the equipment was "totally inoperational for repeated and protracted periods." Data Network planned to stop offering service on the 940 and switch its customers to a General Electric computer and an IBM 360/40, a spokesman said.

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JIM ORTON
Computerworld

'. . . And What Further Evidence of the Problem Do You Need Beyond the Size of Our Final Report?'

Letters to the Editor

Leaving Out Quite a Few

I was initially impressed by Jack Stone's attempt to analyze the attributes of a successful DP department [CW, Aug. 22]. I am in agreement with "his" theorem in which he discovers the DP department also contains humans.

However, I am amused that he seeks this management attitude in only one class of DP installation. I am dismayed that Stone had to disqualify an apparently successful installation because it was "science-oriented." Perhaps he could better negatively prove his theorem by limiting his category to people who process payroll on Tuesday in Roman numerals.

Stone is already leaving out quite a few of us.

J.W. McGonigal
Ann Arbor, Mich.

Question of Liability Coverage

Readers of Alan Taylor's Aug. 1 and Aug. 8 columns regarding IBM's reaction to the amended Australia Trade Practices Act should know the following:

IBM, along with a number of other companies, is seeking clarification of one section of the amended act ("Conditions and Warrantees in Consumer Transactions") that may expose a company to open-ended liability. Australian government officials have said some firms have not been able to get insurance coverage for this risk, and IBM Australia insurance brokers say insurance coverage is not available to protect the company against the increased risk.

It is not true, as Taylor stated, that IBM is objecting to the "Unfair Practices" section of the act. That section was virtually unchanged by the recent amendment, and IBM's internal guidelines on ethical conduct of its employees worldwide are in keeping with it.

Taylor also stated that IBM Australia's action could "strangle" IBM customer operations there. That won't happen. It should be noted that contracts in force before July 1, 1977 are not affected by the amended act.

Ralph A. Pfeiffer Jr.
Chairman
Chief Executive Officer
IBM World Trade Americas/-
Far East Corp.
N. Tarrytown, N.Y.

Implications 'Distorted'

The Aug. 22 front-page headline "DP Deprives Workers of Job Satisfaction, Europe Studies Show" is an example of journalistic distortion that has become far too common in this country. The fact that some study group claims something to be so does not "show" that it is so.

As a matter of fact, an editor with a particular point of view can promote it simply by selecting the right studies and offering their conclusions as fact. Thus we have been constantly advised that one group or another is disadvantaged, one product or another is bad for your health, one business or another is exploiting society — with "studies show" added to imply the existence of hard scientific evidence.

Even more questionable is another headline on the same page: "No Argument: 'DP Causes Unemployment.' " In fact, one of the panelists referred to in the story stated that "on the global level computers will increase employment." Is that what you call "no argument"?

Frederick T. Van Veen
Boston, Mass.

Readers Comment on Degree Requirements

By Jack Stone
Special to CW

The Human Connection

Although I often cavil about the lack of communications in our business, whenever I solicit letters on deeply personal issues, I receive competent analyses. These are usually expressed with proper articulation, easy style and positive intentions.

Now that I have acknowledged all the letters received in response to Ragine Litmen's letter on the bias against nondegreed DPers [CW, July 4] and completed my initial assessment, I will use this first column on the subject to present two particularly thoughtful letters which provide a basis for understanding the nature of the question and planning future actions.

— — —

The first of these letters is from Earl Chrysler of Kenosha Falls, Wis. who provides a historical perspective:

". . . Only a few years ago many employers advertising for programming personal specified 'degree in mathematics preferred." The rationale was not that the person would need to use differential . . . calculus as a programmer. Rather, employers appear to have believed that training in high-level mathematics had developed in one the ability to take a statement of a problem and, through the use of disciplined, logical thinking, define the problem and design a procedure for finding the solution to the problem in a minimum of time.

"Further, these persons were accustomed to working with symbols rather than actual numbers. There is a strong similarity between the manipulation of symbols by mathematicians and the manipulation of mnemonic labels by programmers. The value of the symbol and the contents of the address for which the label stands are irrelevant. What is important is the manipulative procedure.

"Why, then, has the change in preference from mathematical education to business education come about? I offer a possible explanation. Before organizations began selecting persons with a degree in business for programming positions, the majority of the programmers would have either a degree in mathematics or no college degree. As time passed, these persons progressed into positions in the systems analysis area.

"When these persons would interact with user department personnel, they typically would have a communications problem. They were computer-oriented and did not know the tasks associated with the functional areas of business, the information needed by persons in these areas or the terminology of the world of business.

"For example, balance sheet, chart of accounts, standard cost, variance report and vendor lead time would be foreign to the former programmers unless programs they had written had required them to learn the definitions of these standard business terms. It probably occurred to all concerned that a person would be more efficient and effective as an analyst if the person were familiar with the structure and operations of various types of business organizations.

"In order to assure that one has such an awareness, the firm would require future analysts to possess a degree in business. If a firm could be sure that persons hired as programmers would never advance to positions as analysts, the firm would probably not be able to justify requiring a business degree for a programming position. Firms, however, do not know which persons hired as programmers will show the ability and desire to do analysis work.

"As a consequence, some firms could reasonably be expected to decide to require a degree in business of all programmers. As the programmers progress to positions as analysts, the organization has, to me, the optimum analyst — one who understands how business organizations function, converses intelligently with both manager and programmer alike, and knows the capabilities and limitations of the hardware and software which will be used to implement a business information system.

"When I see an advertisement for a programmer . . . which specifies a 'strong background in Bill of Materials . . .' I perceive the firm to be one which has a short-range point of view. When I see an advertisement for a Cobol programmer which requires a degree in business, I perceive the firm to be one which has a long-range point of view and believes itself to be acting in the best interests of all concerned."

— —

The second letter is from Duana Abbey of Des Moines, Iowa, and deals with the professionalism side of the issue:

"The 'Degree Requirement' . . . is indeed a difficult situation. It seems to me that there are two primary influencing situations: First is the fact that the field of data processing has not yet fully delineated itself into vocational, paraprofessional and professional levels. Second is the great demand for people who can get the job done regardless of educational background.

"The first situation is starting to be resolved — the whole question of degree requirements is an indication of this fact. The development of this delineation will be a long and arduous task which will be exacerbated by the second situation. Nonetheless, as time goes along we shall see a formalization of job descriptions and standards for various classes of positions within data processing.

"Academic programs are yet to be fully developed within this discipline and, similarly, work on various types of certification and licensing are in progress. The central need is for the development of a recognized body of knowledge and skills. The idea and advent of professionalism is coming to data processing, and it is not too far off for us to automatically think of having a degree just as we do today with engineers, accountants,

(Continued on Page 17)

Who Should Speak for 'Responsible' DP?

The Taylor Report
By
Alan
Taylor
CDP

There is a tax to be paid by owners of powered aircraft — except under some specific conditions — and such people are expected to file returns with the Internal Revenue Service (IRS), after registering the aircraft with the Federal Aviation Administration (FAA). The FAA registration, however, covers both powered and nonpowered craft and includes details on manufacturer and model number which could be used to determine whether the aircraft was powered.

Recently, it appears the IRS, when picking up the records and checking as to whether people have filed as they are supposed to, has not been checking the model numbers. It has mistakenly been sending letters to glider enthusiasts, suggesting they are delinquent.

All of which brings up the question whether failure to use the records available to avoid such junk mail is one of the duties of responsible data processors.

That there are some such duties — whether or not full use of available files to prevent junk mail is one of them — seems to be unquestioned by DPers. This I saw in the answers to my recent questionnaire regarding the sale of public records. Everyone seemed to agree such sales should be handled cautiously.

But noticeably absent in the correspondence about the issue were any sources for a definition of those duties. And that is our professional problem now. We need a source for definitions of just what our responsibilities are. Let us look at what is needed and then at what we have from which to make our choice.

Organization Needed

The first thing that is needed, of course, is some form of organization, so that appropriate questions can be asked, information gathered, decisions made and information distributed. It is unlikely that such an organization would be small enough to be run as a charity or that it would be able to sell its publications and attract members in sufficient quantities to be self-supporting. Not just yet, anyway.

So that restricts us. We must find some already existing organization that can be reasonably used as a developer and repository of information.

In addition, the organization should be in touch with the rank and file of the profession, because it is the ordinary practicing members who need to know what precautions to take. It simply is not sufficient to be in touch with committees of various sorts, all talking to each other.

Finally, the organization should itself be neutral in determining the proper duties, even though it should be as aggressive as possible once the ideas have been determined.

So with these three requirements — an existing organization, contact with the rank and file and an ability to stay neutral yet publicize — let us look around and see where such an organization can be found.

The Candidates

There are a number of immediately obvious candidates. Our two standards-oriented groups, the National Bureau of Standards (NBS) and the American National Standards Institute (Ansi), are possibilities. So is the American Federation of Information Processing Societies (Afips). But these three have a basic flaw in that they are simply not in touch with the rank and file data processor. And further, at least as far as the NBS is concerned, they often take strong stances on this type of issue, so cannot be considered neutral.

Our various societies — the Association for Computing Machinery, the Data Processing Management Association, the Society of Certified Data Processors, the American Institute of Certified Public Accountants and the Institute of Electrical and Electronics Engineers' Computer Society — seem equally qualified as potential homes for such a group. They are organized and in touch with various segments of the rank and file through their publications. However, they simply cannot be considered neutral and naturally are competitive to some degree. Dominance by one of them would tend to result in a certain dragging of the feet by others.

Yet the societies form a basis for some of the most informed and knowledgeable comment and suggestions, and they shouldn't be disregarded. So what we really need is an organization with a fourth quality — strong connections with the societies.

This fourth point brings to mind the only existing organization that could successfully handle the job — the Institute for the Certification of

(Continued on Page 17)

The Strange Case of IBM

Reader Commentary

By Weaver C. Barksdale

Special to CW

As the great detective strode into the headquarters building of the International Business Machines Corp., he was met by his long-time friend and faithful companion, John Watson, M.D.

"Thank heaven you've arrived, Holmes! My American cousins are most distressed over the condition of the company's common stock. It's a total mystery to us!"

"Come now, Watson. Compose yourself and present to me the facts of the case."

"As you are no doubt aware, Holmes, the company has been quite successful over the years and has produced a record unexcelled in the history of corporate enterprise. Yet the price of the stock remains well below the peak level of 340 that it reached several years ago."

Watson explained the reason. Because of contingent liabilities from several lawsuits, the company has accumulated substantial cash equivalent assets, amounting to about $7 billion at the most recent year end.

With a favorable decision having been recently rendered in one of the cases and with business going well, the directors decided to use some of the cash for the shareholders' benefit. It was assumed that, because the company's stock was so heavily weighted in institutional portfolios, the stock price could not advance because of a significant overhang of supply.

Therefore, a decision was made to absorb some of this excess supply by offering to buy a large amount of shares at a price of 280, which was far better than the prevailing market price of 270.

Very few shares were tendered at 280; the market price rallied to 284, but subsequently fell dramatically. Many thousands of shares were sold at prices as low as 245 when they could have been tendered a few weeks before at 280.

Hearing the tale, Holmes lit his pipe and paced rapidly as he pondered the problem. After a few moments (actually less than half a pipe), his steel-trap mind snapped shut upon the answer. He turned to his friend.

"I have the answer, Watson. The directors stated an hypothesis, tested it and found it lacking; yet they have done nothing to further analyze the problem. They presumed that the supply, or more precisely, the demand for holding the stock, was elastic within its recent price range.

"That is, by raising the tender price above the market price, they hoped to acquire a sizable amount of stock. However, they actually found an inelastic supply."

Their mistake, according to Holmes, was that they addressed the question from the wrong perspective. Since there obviously existed little excess supply of the stock in institutional portfolios, the reason why the price would not rise was that there is lack of demand.

To increase demand, interest in the stock should be broadened, he suggested. One way to do this would be to use the excess cash reserves to further increase the dividend.

With its present cash horde, the company is effectively one of the largest financial intermediaries in the world. The utility of these dollars is much higher, from the shareholders' view, in the hands of the shareholders rather than in the company's coffers.

Another means of increasing in-

(Continued on Page 17)

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Who Can Be Responsible?

(Continued from Page 15)

Computer Professionals (ICCP). This group oversees the various programming, systams analysis and DP managament professional examinations. It is run by representatives of all the societies and still fulfills all the other qualifications.

The ICCP is in touch with the rank and file through the examinations themselves and is able to stay neutral as far as development is concerned. Through appropriata usa of tha axaminations, it could publish ideas concerning responsibility. And further, tha ICCP, while not wealthy, would not have to try to run on the spara proceeds from selling publications.

So I suggest that the profession and the ICCP consider incraasing their sarvice to the DP community. If anyone has other nominations for the repository of ideas about responsible data processing practicas, please write to me.

Naedless to say, I'll keep you informed about any new candidate. Or perhaps some will reject the notion that a repository is needed — and needed quickly.

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Readers Enter Degree Debate

(Continued from Page 15)

architects, management trainees, etc.

"As far as individuals already in data processing or about to enter the field without a degree, I would suggest two things. First, be aware of and accept the idea that professional delineation is coming. Second, discrimination based upon degree requirements is a correctable situation (unlike sex or age discrimination). Thus, individuals in this field without degrees should ba prepared to pursue an education with the blessing and financial aid of their employers.

"Data processing is a young field and there is much work to be done in this area. The supply/demand factor in connection with data processing personnel will tend to cloud the issue, but the appropriateness of such degree requirements can only aid in the maturation of our endeavors."

More on this in later columns.

Holmes Solves Case of IBM

(Continued from Page 16)

terest in the stock, ceteris poribus, is to broaden the number of holders. This could be done by splitting the stock at least on a four or five to one basis.

A combination of a stock split and a dividend increase would be most effective. The small investor would be attracted by IBM selling at less than $50 per share and with a dividend yield in excess of 5%.

"Holmes, you're a genius!"

"It's simply a case of supply and demand — straight out of an elementary economics textbook, my dear Watson. Elementary."

Borksdole is a vice-president in the Investment Management Department ond chief portfolio monoger for employee benefit plons of Commerce Union Bonk in Noshville, Tenn.

How to stretch your DP dollars without getting bent out of shape.

Read our special report on *Stretching the DP Dollar* in the September 26th *Computerworld.*

Working within the tight budget constraints that exist in most DP departments can start with something simple — like a thorough management review of the reports you produce. A few might be outmoded or unnecessary, and these could be eliminated. Others could be produced less frequently; and the reports you rely upon most might be combined. All of which saves not only computer time, but end user, managerial time as well.

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- Making your computer a profit center through timesharing - an applications story.
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- Saving money in a university DP environment — a case study.
- How a municipal government and a state agency cut costs by sharing a system — an applications story.
- Saving money on computer room forms — a survey of innovative methods.

If you're a DP Manager, financial specialist or executive with a flair for doing more with less expense, our September 26th special report will have valuable and interesting information for you. If you market a product or service that helps people save on data processing costs, you should advertise here. Ad closing date is September 9. Get the details from your *Computerworld* salesman. Or call Terry Williams at (617) 965-5800.

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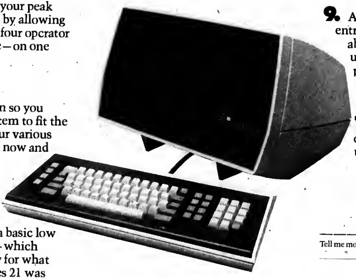

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For MVS System Tuning

'CMF-Realtime' Documents CPE Trends

SUNNYVALE, Calif. — Systems programmers rather than the operations staff in IBM MVS installations are expected to be the primary users of the Comprehensive Management Facility-Realtime (CMF-Realtime) package that will be released by Boole & Babbage, Inc. later this year.

The package allows the user to monitor selected areas of MVS system activity interactively and to evaluate changes in the operating system as they are made, the vendor said. The reports show both current status of various measurements and trends over user-specified time frames of one or more factors, according to a spokesman.

The "trend" portion of the CMF-Realtime display can show how an individual factor changes over time or how a group of factors interact with each other. Sometimes a single measure isn't enough to show a change in performance, but the combination highlights movement — good or bad, the spokesman explained.

Several of the measures, available on a CRT screen or in hardcopy form, are conventional computer performance evaluation (CPE) concerns — CPU, channel and device utilization; paging and swapping rates, for example — but others are specific to the MVS environment.

System Resource Management (SRM) data, an MVS outgrowth of SMF, is one of the newer measures available through CMF-Realtime. In general, the spokesman claimed, CMF-Realtime represents a "significant extension" to the data-gathering capabilities of IBM's Resource Management Facility (RMF) Version 2 under MVS.

The factors to be displayed or reported can be changed dynamically. If one line of inquiry seems to provide no useful information, the focus can be changed, and changed again, until something interesting is found, the spokesman noted.

Because this product has a different purpose than others with apparently similar output — Boole & Babbage's Resolve, for example — it can be used concurrently with them without any conflict, he added.

CMF-Realtime is expected to be available in early November for an introductory cost of $7,500. Boole & Babbage is at 850 Stewart Drive, Sunnyvale, Calif. 94086.

'DMS/OS' Gains TSO Link

SACRAMENTO, Calif. — Available now as a separately priced optional extension of the DASD Management System (DMS/OS) from Software Module Marketing, the TSO Command Processor supports the use of the basic package in a TSO environment.

The most significant enhancements, according to a spokesman, are deferred archive and restore functions and a dynamic restore function.

The deferred support permits the accumulation of data set Archival and Restoration requests from the TSO user regions. These requests are periodically processed by batch jobs, which record the result of the deferring processing in a file which may then be interrogated by the originator of the request, the spokesman explained.

No changes are made in the Data Set Control Blocks (DSCB) to accommodate the deferred processing. All information is stored in a work file which is purged after an installation-specified period has elasped.

The dynamic restore facility can be used to immediately restore a data set from a user region. A tape drive is dynamically allocated to permit loading of the archive tape and the data set to be restored is dynamically allocated on the target DASD volume, the spokesman said.

A control mechanism is included to permit the installation to set a limit on the number of tape drives that can be concurrently allocated in support of the dynamic restore facility, he added.

The basic DMS/OS system is available for $10,000; the TSO Command Processor "selectable unit" costs an additional $1,500, the company said from The Crocker Bank Building Penthouse, 1007 Seventh St., Sacramento, Calif. 95814.

'Front End' Extends Pay Package

TEWKSBURY, Mass. — The Wang Program Products Division of Wang Laboratories, Inc. has introduced a distributed data collection "front-end" facility for the payroll portion of its Super payroll, personnel and pension management system which runs on IBM CPUs.

The network-based payroll data entry software, Pay/Net, works with operators using Wang's Personal Computer Systems (PCS) as intelligent terminals to the Super host machine.

The Pay/Net help includes prompting messages, immediate verification of entered data and positive control over the operation of the remote site payroll function, a spokeswoman said.

Pay/Net features network data security, she claimed. Terminal identification numbers act as authorization codes to validate access to the network, she added.

The software utilizes industry-compatible protocols and procedures in every component delivered, she said.

The Super payroll system — a prerequisite — costs from $30,000 to $50,000 depending on modules implemented on the user's mainframe. The Pay/Net software costs an additional $10,000 and the PCS hardware costs "about $6,000," the spokeswoman added.

Wang is at 836 North St., Tewksbury, Mass. 01876.

'Oscar' Updated

PITTSBURGH, Pa. — Enhancements in the report generator portion of the Oscar project management system on On-Line Systems, Inc.'s remote computing network now enable users to produce comparative reports in addition to those showing critical path method analyses and resource constraints, according to a spokesman.

With the comparative reports, a project planner can check reported, up-to-date performance against the baseline schedule, he noted.

Status comments for each project activity can be included in the comparative reports. Other enhancements allow the project manager to post status information about activity conditions.

Editing of the original plan while work is under way allows users to add, modify or delete activities to reflect real conditions. Later progress reports are then made against the revised base.

On-Line Systems is at 115 Evergreen Heights Drive, Pittsburgh, Pa. 15229.

'Hasp-11' Line Gets New Vendor

EUGENE, Ore. — The Hasp-11 family of communications software, developed by Oregon Research Institute to allow Digital Equipment Corp. PDP-11s under various operating systems to run remote job entry applications into an IBM mainframe, is now available from Datanet, Inc., P.O. Box 30008, Eugene, Ore. 97403.

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Needed Resources Cited in Curriculum Plan

J. Daniel Couger
On
Education

In last week's column, I described the revised curriculum recommendations for an undergraduate program in computer science, prepared by a special committee of the Association for Computing Machinery (ACM). The committee is soliciting comments on its proposal by Dec. 1 before final publication in early 1978.

The report will supercede an ACM report of 1968, commonly referred to as Curriculum '68; therefore I will refer to the new effort as Curriculum '78.

As explained in the earlier column, the new report provides for a 25-course curriculum model. It also discusses implementation, making some strong, specific recommendations concerning resource requirements.

"Data entry devices such as card punches, teletypewriters and display terminals should be provided for program preparation and communication between student and computer'. . . conveniently located and in a large enough area for both easy and convenient student access and use."

Micros Desirable

The ACM Curriculum Committee on Computer Science believes "microprocessors are quite desirable in teaching details of computer architecture previously only attainable by extensive programming of hypothetical computers, simulators or textbook discussions. They have provided a relatively inexpensive and highly versatile resource whch can be used in a variety of ways.

The availability of one or more minicomputers "will allow the students to obtain hands-on experience as well as the opportunity to utilize interactive systems and programming languages which may not be available or practical on a medium- or large-scale computer system."

This kind of equipment also "allows the student to work on software development projects and other projects that might not be possible due to restrictions on the use of the central facility."

A medium- or large-scale computer "should provide appropriate hardware and software support for the major program. Auxiliary memory is required so that access methods specified in the core courses can be implemented and tested.

"Suitable I/O devices and system facilities are needed so that rapid turnaround is possible, interactive computing is available and programming languages used in the curriculum are supported."

The report implies laboratory facilities are frequently inadequate. "Regardless of what specific items of computer equipment are available to support a curriculum in computer science, effective teaching and research in the field requires laboratory facilities. Computer science is in part an empirical science which invovles implementing procedures as well as studying theoretically based processes.

"Because systems, algorithms, languages and data structures are created, studied and measured via combinations of hardware and software, it is essential that appropriate laboratory facilities be made available that are comparable to those necessary in the physical and biological sciences and engineering disciplines."

Software requires attention equal to hardware, according to the Curriculum '78 report. "For the student to master the material in the core and elective courses, sufficient higher level languages . . . [and] special-purpose systems such as statistical systems, data base management systems, information storage and retrieval systems and simulation systems should be available.

"The student of computer science must have available, in some form, language, programming and systems manuals as well as documentation for programs and other materials directly related to the development and use of systems. This material must be easily and conveniently available to the student at all times."

Staff Requirements

No less than six full-time faculty members are necessary to offer the minimal program, in the opinion of the committee.

While it recommends faculty background primarily in computer science, the committee is realistic enough to recognize this is not always possible.

Additional instructors can come from computer center staff and other academic departments, the report noted.

"Articulation" — setting up vertical communication channels with groups outside the institution where the computer science program is being developed — should occur with local high schools and community colleges which provide input to the program. Equally important is discussion with employers and graduate schools which utilize program output.

Curriculum '68 paid little attention to articulation needs. On reading it, one had the impression that the committee intended it to be the bible to which all affected organizations and persons were to conform.

The recommendations on Curriculum '78 are more pragmatic. They facilitate flexibility in curriculum implementation to cope with varying circumstances and resource levels.

Couger is professor of computer and management science at the University of Colorado.

Package Creates On-Line Code

HOUSTON — Batch programmers working with Hewlett-Packard Co. HP 3000s can create terminal-oriented programs "more easily than they might expect" with the support of the Instasystems software from Systems Communication Corp. (SCC), according to the vendor.

Designed for use from local or remote terminals, Instasystems provides a menu approach to program building and later execution that requires no change in the basic system software provided by HP, an SCC spokesman added.

In a typical operation, the system displays a menu of applications available to a user as soon as the user has signed on and identified himself. Once the application is selected, a new menu offers a choice of functions to be performed, the spokesman continued.

From there it works down to the point of displaying data entry screen formats and accepting data which it provides to as many as eight programs.

Instasystems includes a menu-building command so the support it provides is pertinent to the user or users involved. Beyond that, a HELP command is available that displays unique user-written screens of information that can vary depending on when the call for help is made, he said.

Instasystems can work with files created by any of the HP access methods or with data bases under Image he added, but it also has its own indexed I/O support.

The package is available for lease or purchase. The license fee is $5,100, SCC said from Suite 300, 1721 Pech Road, Houston, Texas 77055.

Multimedia Course Eyes Intelligence

KANSAS CITY, Mo. — Developed by MIT, "Artificial Intelligence" is a multimedia curriculum from The Edutronics Group that investigates "the real nature and action of 'intelligence,' " a spokesman said.

The 24 course modules examine "intelligence" as a product of a family of logical qualities that can be studied abstractly without concern for the particular systems that manifest intelligence. The course provides practical knowledge for those interested in making computers more useful as well as insight for those who wish to understand the nature of intelligence, he said.

The lectures and classroom discussion are presented by associate professor Patrick H. Winston, director of MIT's Artifical Intelligence Laboratory.

Edutronics is at 3435 Broadway, Kansas City, Mo. 64111.

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'Csar' Enhanced

ATLANTA — The Computer Scheduling and Reporting System (Csar) from Computer Concepts Corp. has been updated so there is less detailed work for the scheduling personnel.

With Csar II, the user identifies only the class and priority a job is to have, its successors and the earliest start time it can reasonably use. From that, the package builds a schedule without the constraints inherent in the original Csar system, a spokesman said.

All information processed by Csar II is maintained in a single sequential file which contains, among other things, calendars and records for each production job scheduled.

Written in ANS Cobol, the batch-oriented Csar II has been used on IBM, Burroughs and Honeywell equipment. In the IBM environment, it requires 128K bytes plus a sort region.

Source code for the scheduling package is available now for $9,500, Computer Concepts noted from 6244-A New Peachtree Road, Atlanta, Ga. 30340.

Package Shows Fortran Values

ANAHEIM, Calif. — The Fortran Termination Monitor, developed by Pilkerton International for its own use in debugging program problems, is now available generally for $50.

Designed to work in any IBM OS or OS/VS system, the package does not interfere with normal Fortran program execution, according to a spokesman. It simply "steps in and captures" the values of user-selected variables whenever an Abend occurs, he said.

These values are often the keys to the problem, but they are sometimes difficult to find, especially in floating-point operations. Cryptic error messages and dumps that require conversion from "hex" to decimal before they can be read make debugging an error-prone, time-consuming task, he added.

The monitor can report on as many variables as the user requests prior to run time, but each requires 10 bytes so there may be limits on how many a programmer can retain even if the software logic has no such constraint, the spokesman noted.

The Terminator prints the current values of the variables if a job is aborted with an error. People on the Pilkerton staff have found it so useful they use it even though it's not a required part of the development process, he claimed.

The $50 the company charges for the software covers the cost of reproducing the program, documentation and the postage, he added.

Pilkerton can be reached through P.O. Box 6372, Anaheim, Calif.

'Soup' Eases Updating

ATHENS, Ga. — The Source Utility Program (Soup) from Cosmic reportedly allows the IBM 360-based Fortran programmer to do symbolic updates to selected subprograms, to compile those updated programs and to update an object file, deleting the old object code.

Soup can be used to create a new source file or an object file. It can also produce a listing or a punched deck of the entire file, of the updated subprograms or of the updated portions of code, according to a Cosmic spokesman.

The source and object files handled by the package — which was developed at the Goddard Space Flight Center — are sequential data sets, normally generated as files on magnetic tape. The routines within Soup have been found to be "much faster" than the standard IBM OS/360 utilities that perform the same function, the spokesman claimed.

Soup is written in Fortran IV and has been implemented on an IBM 360, utilizing 26K bytes of main memory.

Made up of approximately 338 source statements, the utility is available only as a listing which costs $25. It should be ordered as program number GSC-12268/ CW, the spokesman added.

Cosmic is at 112 Barrow Hall, University of Georgia, Athens, Ga. 30602.

'Disk-O-Tek' Eyes Space

ATLANTA — The Disk Organization Technique (Disk-O-Tek) package from NCI, Inc. is a dynamic disk space allocation system controlled by parameters entered in the JCL stream. It was designed for IBM DOS and DOS/VS environments, the vendor said.

Like a number of similar packages, Disk-O-Tek truncates sequential file extents after the file is closed so overallocated space is made available for other uses. This control measure is applied, however, on a file-by-file basis as indicated by the user.

Marker on Vtoc

Because a number of users are expected not to use the automatic truncation feature without some sort of encouragement, Disk-O-Tek puts an end-of-file marker on the volume table of contents (Vtoc) of all sequential files. In Vtoc printouts, then, the user can see just how much space is being wasted, NCI said.

When that happens, he can invoke the truncation for each of the overextended files and Disk-O-Tek will truncate the extents near the end-of-file marker.

The package also has a utility routine that can delete, revive or locate files generically; produce Vtoc lists of space used and available; or produce a file with all active Vtoc records and print information from selected files in character or "hex" format.

Additionally, the utility allows for the printing of a fixed number of records, number of tracks or number of cylinders.

Disk-O-Tek is available under a permanent license for $2,750 or $110/mo, the company added from 6075 Roswell Road N.E., Atlanta, Ga. 30328.

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Data Briefs

Expo to Focus On Fiber Optics

NEWTON, Mass. — The Fiber Optic Communication and Information Society (Focis) will present a fiber optics exposition here Sept. 15.

Admission is free to Focis members; there is a $10 admission for nonmembers; and the cost is $15 at the door, a Focis spokesman noted.

Further information about "Fiber Optics How and Why" can be obtained from Focis, Box 2264, Vernon, Conn. 06066.

Decwriter II Prices Drop

MARLBORO, Mass. — Digital Equipment Corp.'s Components Group has announced volume price reductions up to 10% on its LA36 Decwriter II.

The 200-unit price has been reduced from $1,390 to $1,250 each. Other reductions vary according to quantity. Price reductions begin at the 50-unit quantity level, DEC said from One Iron Way, Marlboro, Mass. 01750.

HIS Offers Seminars

WALTHAM, Mass. — Honeywell Information Systems, Inc. will conduct three seminars in different cities on communications concepts for large-scale communications users.

The first seminar will be held in Chicago Sept. 7 and 8; the second will be held in Dallas Oct. 26 and 27; and on Nov. 29 and 30, HIS will conduct the third in Los Angeles.

Information on the courses is available from Dave Cook, Manager of Educational Services, HIS, 110 Cedar St., Wellesley Hills, Mass. 02181.

Atlantic Forms User Group

ALEXANDRIA, Va.— Atlantic Research Corp. has formed a users group to exchange Intershake II programs and test applications.

Information on the Intershake II/Users Group can be obtained from Garland Audielet at Atlantic Research, 5390 Cherokee Ave., Alexandria, Va. 22314.

Stored-Program Controlled

Bell Planning Nationwide Net

MURRAY HILL, N.J. — The Bell System has announced plans for a nationwide communications network that it said will deliver new services and operating efficiencies over the next 25 years.

In addition, Bell has developed a microwave radio system that reportedly will handle three times as many data and voice calls as its current top-capacity long-distance radio link.

Bell's future communications network will involve electronic switching systems (ESS) interconnected by a high-speed signaling system to enable more effective communications, the company said.

The combination of the ESSs and the signaling system is called the stored-program controlled (SPC) network, Bell said.

As the SPC network evolves, users will notice faster setup times for call connections — as fast as two seconds for a coast-to-coast call, according to a Bell spokesman.

Implementation of the SPC network will involve a long-term technical effort, including installation of ESSs in Bell telephone central offices, the spokesman noted.

A complementary part of the effort, he added, will be expansion of the new signaling system, known as Common Channel Interoffice Signaling (CCIS).

(Continued on Page 24)

Project 'Ahead of Schedule'

Terminal Slashes Reporting Time

By John P. Hebert
CW Staff

NORTH POLE, Alaska — A construction firm headquartered in Houston has reduced time, money and project report errors with a key-diskette communications terminal at its building site here.

Before Litwin Corp. installed the Data 100 Corp. Model 77 key-diskette terminal in "the dead center of Alaska," it needed three weeks to send manpower and construction materials needs reports to the home office, according to LeRoy Fronk, Litwin's DP director.

'If construction was delayed past the central Alaskan building season from March to late September for any reason, Litwin personnel would have to pack their bags and come back after the spring thaw, "and that would cost time and money," Fronk said.

Fronk said Litwin has cut construction project reporting time from more than three weeks to less than 48 hours, reduced errors significantly and given its client, Energy Co. of Alaska, a level of detail in its reports that was not feasible with the previous system.

"This has allowed us to act rather than react to changing conditions and that means the difference between profit and loss," Fronk noted.

Before installing the terminal at its campsite 15 miles north of Fairbanks, Litwin telecopied coded sheets containing labor distribution data and units of work completed from remote sites to its Houston headquarters. From there the information was keypunched and transmitted by a Data 100 Model 76 to United Computing System in Kansas City, Mo., for processing.

The process, which took several weeks, produced reports that compared actual productivity to forecasted needs. The resulting reports, which were printed in Houston for forwarding to the remote stations, detailed how a project was doing from both a financial and physical percent-complete basis.

"The problem was," Fronk noted, "that you rarely had time to react to the data. By the time you received it, it was already outdated and with time breathing down your back, you had to make some very sophisticated guesses."

(Continued on Page 24)

Telenet Files With FCC To Extend Service to Hawaii

WASHINGTON, D.C. — Telenet Communications Corp. plans to extend its packet-switched service for data communications to Hawaii this fall in cooperation with the Hawaiian Telephone Co.

The two carriers last month filed a joint application with the Federal Communications Commission (FCC), according to spokesmen for the carriers.

The proposed service offering is designed as an economic means of communications between computers and a wide variety of terminals operating at low to medium speeds. It will be available on a demand basis with rates based on the volume of data exchanged, Telenet stated.

Trans-Pacific cable facilities will be used to connect the Telenet network in the continental U.S. with Hawaiian Telephone's operating center in Honolulu.

The CCITT X.25 packet-mode interface reportedly will be supported by both carriers, permitting synchronous as well as asynchronous communications.

In a tariff submitted with the FCC application, traffic charges have been set at $4 per thousand packets.

Rates for public dial-in service at 10 to 30 char./sec will be $2.40 an hour from Honolulu to any point on the U.S. mainland, it added.

Dedicated facilities at monthly rates will be provided for asynchronous transmission from 75- to 1,200 bit/sec and for X.25 synchronous transmission at speeds up to 9,600 bit/sec, according to Telenet.

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Bell Planning National Net, Microwave System

(Continued from Page 23)

This will eventually interconnect all the new ESSs, enabling them to share call-handling information in high-speed digital form over communications pathways separate from voice circuits, he said.

Some of the new services reportedly will stem from the SPC network's ability to forward a caller's telephone number to the local central office serving the called party.

Some possibilities for new services in the 1980s include:

- Identification of priority callers by means of distinctive ringing for calls from preselected numbers;
- An automatic callback system that would make note of a busy signal, wait until the line was clear and then dial both numbers and connect the two lines; and
- Preselection of telephone numbers from which collect calls could be accepted without operator assistance, according to Bell.

The SPC network will also offer other services designed specifically for business customers, the carrier said.

The Bell System is now implementing the first stage of SPC network evolution for long-distance call handling; and some coast-to-coast calls presently are being routinely set up by CCIS, according to Bell.

Microwave System

Bell also has developed an advanced microwave system that it said will handle three times as many data and voice calls as its current top-capacity long distance radio link.

The technology of the AR6A system will permit more efficient use of the radio frequency spectrum now available for long-distance telecommunications, according to Bell.

The system is being field-tested beginning this summer in Massachusetts. It will be able to carry 6,000 calls per channel, compared to 1,800 for the highest-capacity microwave radio link now used by the Bell System (TH-3), a Bell spokesman noted.

Bell's AR6A will be the first of its kind to use "single sideband" (SSB) technology for high-capacity, long-distance microwave transmission, he said.

SSB reportedly "packs" more telephone conversations into a radio channel without sacrificing transmission quality. As a result, more information can be carried in a frequency band and the frequency spectrum is used more efficiently, Bell claimed.

AR6A will operate at a frequency of 6GHz and will handle both voice and data signals, he said.

Switching Equipment

Like present radio systems, it will incorporate its own protection switching equipment. If a channel should fail, for example, the equipment is capable of automatically sensing this. It can then switch to another channel.

In AR6A, the protection equipment is controlled by microprocessors, Bell added.

AR6A will be field-tested over a 26-mile radio path between Ashburnham and Wendell, Mass. The trial is being conducted by Bell Labs in conjunction with AT&T Long Lines and Western Electric.

This test, which will continue through 1978, and subsequent ones planned on another six-hop radio route through mid-1980, will determine how the system performs under actual operating conditions, the spokesman noted.

AR6A is scheduled for initial commercial service by mid-1980.

By the late 1980s, SSB systems could account for most of the new long-distance route mileage added to the Bell System's microwave radio network, according to Bell.

Terminal Reduces Job Time

(Continued from Page 23)

Because of the number of variables on any job, the lack of proper information could set an entire project off schedule. "Local productivity is always a question and very hard to track against a standard measure because it fluctuates from area to area. So you could be well ahead of a project somewhere and, given the same manpower, far behind in another," Fronk said.

'No Surprises'

To speed up the data cycle and decrease the number of errors that always crept into the system, Litwin examined two alternatives: local service bureaus and the Hewlett-Packard Co. HP 9830 calculator.

"But communications was the answer. We wanted information at the home office faster and we didn't want to relinquish control of the network because our locations are much too remote to rely on somebody else if something went wrong," Fronk recalled.

The only alternative remaining was a communications terminal and Litwin needed a data entry device capable of binary synchronous communications to recheck transmitted data and capable of emulating IBM's Hasp 360/20 workstation, Fronk said.

In addition, since most of the progress reporting programs had been written, documented and tested, Litwin needed a machine that could easily adapt to software changes.

The petroleum facilities construction firm chose the Data 100 device because of past experience with the company. Litwin has had a Data 100 Model 74 for three years which has been out of commission only twice, according to Fronk.

And Litwin has only made one call to Data 100 on the Model 77 here — because of an electrical power surge — even though the terminal sat at a warehouse in Fairbanks where it had blasts of warm and very cold air from warehouse doors being opened and closed, Fronk recalled.

Data Entry

Now data, including payroll information on local laborers and data on man and machine hours billed against different line items, is entered daily by an operator in North Pole on the system's 256-char. CRT.

The terminal performs table look-ups, range checks, batch balancing and any number of other edits and checks — all functions that were programmed by Fronk and his staff.

"With these intelligent features, we know the data is virtually error-free when we send it down the line," he explained. "There aren't any surprises three weeks later as there used to be."

Once collected on diskette, the data is transmitted at 2,000 bit/sec on Saturdays to Kansas City over Glacial States Telephone and then RCA Globcom lines — a process that takes three to four hours and costs $61 an hour or "about $1 per page," Fronk said.

In Kansas City, it is processed by United Computing System's Control Data Corp. Cyber 175 computer system.

By 8 a.m. the following Monday, the data has been processed and the appropriate data printed on the company's 62 line/min printer here at North Pole.

At the same time, the construction progress and piping reports are also printed out in Houston for headquarters personnel, Fronk noted.

Line Problems

Fronk said Litwin has had line problems at the Alaskan end of the communications network. Glacial States' attitude is that if the lines work properly four out of five times used, then it is good enough for data, he said.

Fronk chose a synchronous terminal over an asynchronous device because of the phone problems and "we haven't had the problems other users there have had.

"The others all said they have horrendous problems trying to communicate with the 'Lower 48,' but they are all using low-speed asynchronous terminals," Fronk said.

"With those low-speed terminals, if you get a hit on the line, it's tough luck and try again," he added.

With the reports being on schedule, and with communications problems at a minimum, Litwin has finished the project at North Pole three weeks ahead of schedule, Fronk said. All things considered, the terminal has ensured that neither Litwin nor its clients were left out in the cold.

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Ann Arbor Terminal Controller Allows Single-Line Addressing

ANN ARBOR, Mich. — The Ann Arbor Terminals, Inc. model R2050R CRT controller reportedly permits multiple read-only displays to be remotely addressed and written over a single communications line.

The controller is intended for industrial and business system applications where multiple CRTs are needed. The unit is said to reduce system costs by eliminating the need for multiple CRT electronics and multiple computer-to-CRT interface cards.

Four display channels can be driven from one controller and up to 16 controllers can be plugged into one interface card, a company spokeswoman explained.

The unit displays 20 lines at a density of 50 char./line. Characters are upper and lower-case Ascii written in 7 by 9 dot matrices.

The unit comes with an RS-232 interface. RS-232 input is regenerated within the unit and output through an auxiliary data connector to drive the next unit in line, she explained..

A "dip switch" on the controller allows the setting of both the unit address and transmission speeds from 110- to 9,600 bit/sec.

Options for the R2050R CRT controller include a fifth video connector and select option, character accent and current loop interfaces.

Prices for the controller begin at $1,095, which includes one display channel. Other prices depend on the number of display channels needed and options ordered, the company said from 6107 Jackson Road, Ann Arbor, Mich. 48103.

Megadata Broadens Line With Stand-Alone CRT

BOHEMIA, N.Y. — The MC77 terminal from Megadata Corp. has been developed for applications requiring CRTs performing intelligent stand-alone functions with storage requirements of 4K words.

The terminal has a keyboard with up to 84 alphanumeric and function keys and a 12-in. diagonal display. It can transmit data at speeds from 50 to 38,400 bit/sec in serial mode and 10,000 char./sec in parallel mode, according to Megadata.

The terminal is suited for installations where large numbers of terminals are required, including data entry systems, multidrop communications networks and data transaction systems, the company noted.

The MC 77 is available as a programmable read-only memory (Prom) firmware preprogrammed device, supporting up to 3K of internal program, 1K of program storage and 4K of internal data storage. An unabridged series of computer interfaces is available for it, Megadata said.

The MC 77 can be used as a stand-alone device or up to eight terminals can be clustered and interfaced to one data port.

Prices for the MC77 range from $1,950 to $2,950 depending on options and quantities needed, the spokesman noted from 35 Orville Drive, Bohemia, N.Y. 11716.

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TECHTRAN

Soroc Drops Price On IQ 120 CRT

ANAHEIM, Calif. — Soroc Technology, Inc. has reduced prices on its IQ 120 CRT/-keyboard terminal.

The price for end users has dropped $255, bringing the cost of each terminal to $995, according to Soroc, which added quantity pricing has also been reduced.

The company said it is developing "more sophisticated" terminal equipment, scheduled for introduction later this year.

Soroc can be reached at 165 Freedom Ave., Anaheim, Calif. 92801.

USD Has ASR 33 Adapter

PHOENIX, Ariz. — United Data Services Co., Inc. (UDS) has introduced an auxiliary equipment adapter for use with Model 33 Teletype Corp. terminals.

Designed to facilitate expanding the capabilities of computer console teleprinters, and remote time-sharing terminals, the adapter provides the Teletype with an auxiliary I/O port which permits the device to function as an integral part of the teleprinter system, UDS explained.

The auxiliary adapter makes it possible to add a disk/-tape cassette unit, X-Y plotter, punched card reader or other auxiliary terminal device to a Model 33 Teletype.

The on-line communications mode is determined by the external signal line wiring and the auxiliary device is placed in the local loop with the keyboard, typing unit, etc. for off-line preparation or transcribing of data in the Teletype "local" mode, UDS stated.

The auxiliary equipment interface of the adapter directly accepts equipment with standard RS-232 electrical interfacing or, when equipped with an appropriate interconnecting cable, can be used to drive a 20mA. current loop interface, the company added.

Installation reportedly requires no drilling, soldering or wiring modifications.

The adapter is priced at $110 from UDS at 3024 N. 33rd Drive, Phoenix, Ariz. 85017.

Threshold Has T500 Tester

SAN MATEO, Calif. — Threshold Technology, Inc. has introduced a portable diagnostic test system that it said permits users of its T500 voice data entry terminal to test and repair the terminals on-site at work locations.

The T500 diagnostic system is a briefcase-sized unit that allows immediate field analysis of any fault down to the circuit board level, Threshold claimed.

It must be used in combination with the 4520 interface board, an option now available for all T500 terminals.

The diagnostic system consists of a numeric keypad, an alphanumeric display and a cassette tape unit. The cassette tapes supplied with the system contain digital data needed for diagnostic comparisons and also provide audio instructions to lead the user through sequential test steps, the company noted.

The system also contains port monitors which enable on-line tests to determine if the proper communications signals are being transmitted between the T500 terminal and the user's host CPU. They also test the interaction of the terminal itself with its own operator display and local console, it stated.

The diagnostic device costs $3,000, according to the company, which can be reached through P.O. Box 5332, San Mateo, Calif. 94404.

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Form Design 'Crucial'

State Saves $12,000/Mo With OCR Units

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Minnesota's Department of Public Welfare saves about $12,819 a month by using optical character reader (OCR) equipment rather than direct key-to-tape-or-disk machinery to process its medicaid assistance payments, attendees at the recent OCR Users Association conference learned here.

If the department were to go to key-to-tape or key-to-disk equipment to satisfy its data entry needs, 17 additional keystations would have to be acquired to supplement the nine already in operation, according to Robert G. Meyer, administrative assistant with the department's Bureau of Income Maintenance.

"We'd also have to run extra shifts," he added.

The public welfare department went to OCR equipment when the state's legislature decreed that too much money was being spent by the government to pay bills — including medicaid claims filed by such providers of care as physicians, dentists and pharmacies, Meyer explained.

"OCR helps reduce administrative costs so the problem of processing these claims is not as large as it could be," he said, acknowledging that these costs — as with all expenses associated with medical services — continue to be high.

OCR-Readable Forms

Because this data entry technology provides a savings, however, the department of Public Welfare has taken the stand that it must process forms that are OCR-readable. It has done so despite opposition from the providers of care who initially went directly to the state legislature to demand uniform forms, Meyer stated.

The department's willingness to adapt forms and/or the system to permit the use of its Recognition Equipment Inc. (REI) OCR machinery has served to mollify these original objections, he added.

Operational in 1974, Minnesota's system for processing Medicaid claims was one of the first to be federally approved, and thereby eligible for federal funds under the U.S. Department of Health, Education and Welfare Medicaid management Information Systems (MMIS) program, Meyer said.

The state's Bureau of Income Maintenance, which administers the claims payment program through its Medical Assistance Division, uses REI's Input 80 Model C system with nine Total Data Entry (TDE) stations attached to it. Processing power for the program comes from three IBM 370/158s, courtesy of Minnesota's Department of Administration, he noted.

The TDE stations scan the claims forms once. Any errors are corrected manually on a CRT and entered onto the same tape for processing, Meyer continued.

The system includes the ability to send a statement to the medicaid beneficiary to explain what services have been paid for under the federal program, he said.

"We did benchmark OCR equipment in the beginning," Meyer stated. "REI proved to be best at that time at handling our needs."

The equipment can handle almot any font available, reading character by character, he added.

Minnesota's MMIS processed 560,681 forms in the first quarter of 1977. Its OCR equipment read those forms with a 90% accuracy rate, Meyer said.

The providers themselves, however, are the key to any successful medical claims processing system, he stated.

"Most people can't figure out how we got our physicians, dentists and other providers to type their claims," Meyer laughed, noting that OCR systems are much better at reading typed rather than handwritten forms.

"We told the 10,000 providers on the system that they didn't have to type their claims — but added that if they didn't, we couldn't guarantee when they would receive payment," he explained.

Today, 90% of the claims the state receives on paper can be read by the OCR scanners, Meyer said. Providers receive payment in an average of 19 to 20 days.

Few of the state's medicaid service pro-

(Continued on Page 32)

Century to Criterion Conversion Accomplished in Three Weeks

DENVER — "The cost for converting from one mainframe CPU to another can often equal two years of lease expense for the hardware. We did the job, and with no modifications, in just three weeks. During my 16 years in the DP industry, I've gone through seven conversions and this was by far the easiest," according to John L. St. John.

St. John is the director of Management Information Services for St. Anthony Hospital Systems here. He was describing the hospital's upgrade from a 64K byte NCR Corp. Century 200 CPU to a 256K byte NCR Criterion 8570.

The conversion entailed coupling the old and new CPUs, copying existing programs from the 30M byte disks to the 100 M byte replacements and then uncoupling the CPUs. No parallel operation was required and no programs were written.

Because the Criterion is eight times faster than the Century it replaced, St. John said that throughput has been improved 50% to 60%, depending upon the operation. This met the needs for an expanded DP capability while providing time to write modified applications at leisure.

The Criterion's ability to emulate the Century through firmware, enabling the old programs to be converted for the Criterion's use, was a significant feature, according to St. John. He noted that the hospital's latest addition can also function as a Cobol virtual machine and can compile Fortran, Neat 3, RPG and Basic.

The hospital is leasing its Criterion system for several thousand dollars a month less than it would have had to pay for doubling the size of the predecessor Century 200. This hardware economy was a central factor in St. Anthony's installation of the Criterion, St. John noted.

With the knowledge that the Century lease was due to expire in Sept. 1976, the hospital considered it appropriate to review its whole approach to DP, according to St. John. Three possibilities were considered:

- Giving up the in-house facility and going with a service bureau.
- Switching to a facilities management contract.

(Continued on Page 32)

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Recognition 'Long Overdue'

'Ideal' DP Auditor Needs Range of Experience

By Jay Allen
Special to CW

Today's DP audit function is just beginning to receive the attention, budgetary considerations and recognition that is long overdue. It is not surprising to find a tremendous diversity of opinion, thinking and approaches as to the qualifications, role and function of the auditor.

A composite profile of what would appear to make up the "ideal professional" in the DP audit field would be a person around age 31 holding a Masters Degree in Business Administration. The person should be the holder of one or more certificates (CPA, CIA or CDP), have performed systems analysis/design, some limited programming, internal audit experience and some experience with one of the major CPA firms would be nice.

The auditor should be knowledgeable in hardware, terminals and software. The individual's personality should be outgoing yet tactfully aggressive and the person must work equally well with auditors and DP specialists (a few of whom will consider their systems as their private domain which could do without outsider intrusion). An ability to walk on water is helpful.

The more progressive data center management will see the DP auditor as a friend and ally, who through a strong team effort will improve documentation, standards, security, results and in general create a more reliable DP function.

It has been said that the primary objective of the DP audit function is to insure that the systems integrity within the company operations are adequately safeguarded, that completely reliable financial information is not being compromised and that generally accepted accounting principals are consistently being applied. Before an effective DP audit program can be established, it must be compatible with the overall corporate audit objectives (which are assumed to exist).

Overall Function

It seems that most general auditors or DP audit managers would define their overall function to include some or all of the following responsibilities:

- Participation as a member on the company DP steering committee on all computer related activities.
- An evaluation program to ascertain the effectiveness of data processing systems and operations, consisting of a review of DP costs, plans and future estimates, a review of procedures and standards within the DP and user organizations and post-operational reviews for operational savings and effectiveness.

This includes asking if the new system fulfills the user needs and if all the older systems are really necessary and cost justified or if they are still being run just to fill file drawers.

- To participate in negotiations between the user organizations and DP organization concerning source allocation and operational budgeting.
- Prepare reports concerning operating differences between the user and the processing facility.
- Review and approve the design enhancements of new or existing systems to insure adequate controls will be included and make recommendations where improvements are noted.
- Perform and review DP systems feasibility studies for possible opportunities for cost reductions.
- To prevent intentional or unintentional mistakes in the handling of mechanized information.
- To insure adherence to management policies and consistent accounting practices.
- To insure that the user has an adequate user manual and understands the output.
- To guarantee that all proper standards and procedures are enforced relative to security of the center, terminals, data files, backup, disaster recovery and data base integrity.

For those companies just beginning to implement the function, it may be most practical to do so in stages.

Phase-In Program

Stage one would be an audit within the current systems environment. During the first phase, the DP audit function should make contributions to the DP environment. The audit function should be familiar with the operations of the DP department and operate effectively at this point.

Stage two would develop a systems assurance package.

This stage of development of computing auditing will provide management with a higher degree of assurance that existing computer systems are functioning within established guidelines.

As the first two stages are being completed, the Audit staff will have time to become more expert in systems and programming. The staff will be well versed in DP auditing knowledge, accounting techniques and DP control procedures.

Stage three would monitor systems on a continual basis. As the state-of-the-art in the computer field rapidly progressed, new DP audit techniques must keep abreast of these new computer systems and techniques.

'Preventive' Auditing

The third stage of DP auditing involves a switch from the traditional "after-the-fact" audit to the review of events prior to their occurrence. This preventive auditing should make a particularly valuable contribution to management. Reaching the level of monitoring systems on a continual basis can be considered a long-term project.

Stage four would involve future development and planning. Future planning will allow the audit function to adjust the direction of the audit function as business conditions dictate.

In my judgment, the newly energing DP audit professional and his corporate management should consider that the organizational structure and level at which DP audit is placed is crucial to its effectiveness. It must be completely independent of DP and at a corporate level in which DP management can not dictate or direct.

A definite movement and detailed planning should go into a comprehensive certification program which would lead to certified DP auditors. This would normally include experience and expertise in systems design/programming, hardware/software knowledge, teleprocessing, cost effectiveness and performance evaluation, security standards, insurance coverage, controls and system verification.

As computer systems and technology become more complex, it may no longer be feasible to assume that the firm's large accounting firm can provide timely expertise to one of the corporation's most valuable assets which is the DP function and all corporate data.

Associations Valuable

It seems important that all DP auditors become active and participate in their local EDP auditors association and if a chapter doesn't exist, guidance is available on starting one and how to become affiliated with the International EDP Auditors Association.

Since it is critical that DP auditors be tactfully aggressive and interface well at every level, it may be important for them to attempt to upgrade that part of their personality through a variety of methods available to us today.

We can encourage major universities to offer broader and more specialized curricula in the field of DP audit.

Today's DP auditors have an opportunity and responsibility to provide leadership and training to the vast internal audit profession as to the ways in which the computer can be easily used as a powerful internal audit tool which can save valuable man hours.

Allen is specialist with EDP Auditors Unlimited in Oklahoma City, Ok. 73112.

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(Continued from Page 29)

viders aren't involved in this scheme of claims payment, he added. One other incentive the system has in its favor is that it handles approximately 30% of the medical care dollars available in the state.

Medical providers don't want ot lose 30% of their cash flow. They would have to turn away all medical assistance recipients if they didn't participate in the claims processing program, Meyer said.

Much of the compromise between the providers and the state's MMIS has been in the area of forms design, he noted:

Minnesota has 15 different claim forms in use now.

Meyer acknowledged the work of other states in the MMIS area. "Michigan's data entry system was the best we saw, and we have borrowed a great deal from their forms design."

Minnesota has begun to depart from pink forms, which drew provider ire on the basis that they are hard to read. Experiments with brown ink indicate the brown forms microfilm better and can be photocopied, according to Meyer.

"We learned that there are so many areas to be considered in forms design that it's impossible to develop the optimum form in one shot," Meyer said.

Forms need to provide adequate space for entry of data elements. In addition, forms should have "integrity" — flowing in such a way that the claim information at the top of a form relates to the information at its end.

Meyer added that the state is now trying to design its forms in such a way that it doesn't ask for every bit of information needed.

"We are striving to find the lowest data form element denominator by which we can derive some of the necessary data from other information supplied on he form," he said.

The "uniform claim" concept — the use of a single form for all third-party payers — is clearly the best direction for further work in the forms area, Meyer suggested.

Uniform forms would facilitate clerk-form familiarity, standardize procedures and collection codes, and minimize provider staff training on how to complete the claims forms, he said.

Meyer's experience in Minnesota in the development of uniform claims forms has not been as good as he would like it to be, however.

In describing his efforts to work with other interested groups, such as the American Hospital Association, on this problem, Meyer stressed the need for cooperation.

He also emphasized the importance of education as to what OCR is. Describing OCR as "a very cost effective means of capturing data," Meyer noted that people working on claim forms usually haven't had experience with OCR.

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Century-Criterion Switch Accomplished in 3 Weeks

(Continued from Page 29)

• Upgrading the in-house facility, but with the possibility of switching to another vendor's hardware.

"We knew that our emergency service was going to grow along with the general needs of the hospital. In addition, plans to increase the satellite unit would nearly double the DP needs of the facility," St. John recalled.

"What we were projecting was 20,000 to 22,000 daily computes transactions. That was a year and one-half ago and we've reached that volume today with more growth certain to come," he added.

After weighing the pros and cons, the hospital rejected the service bureau possibility. The feeling, he said, was that while such firms do offer much in the way of health care DP, their approach is, of economic necessity, a standard one.

Thus, there is built-in resistance to change, and that kind of attitude, in addition to being overly confining presents unwanted obstacles to meeting the changing needs of an institution such as St. Anthony. Also vetoed after consideration, St. John said, was the facilities management concept.

"The theory there," he said, "is that you can get rid of your headaches by putting them off on someone else. But in reality, you don't eliminate them, you just remove one step.

"True, the people aren't on your payroll, but that just makes them less responsive. In addition, if an operator is out ill, your processing gets held up just as it would be if you paid the operator's salary directly. The facilities management people can't do any better at hiring a temporary replacement than you can.

"Then too, there's the matter of accountability. A hospital needs a DP center that is completely responsive to its unique requirements. Arguing about those requirements with someone who isn't even on the staff is not only an unnecessarily bruising experience, but one which is generally unproductive," St. John explained.

Since through a process of elimination the hospital had decided to upgrade its in-house facility, the question then became one of deciding which vendor was best. NCR's record of maintenance and service was given consideration, St. John said, but not undue weight, since it was felt that any of three other vendors could prove equally dependable in these respects.

"The hardware of two of the other vendors was simply too expensive in consideration of what we could get for less money with the Criterion. In addition, the cost for conversion to either system was simply out of reason.

"The hardware of the third vendor was quite competitive with the Criterion on a price/performance basis, but again the cost of conversion was too high," he said.

Benita H. Arrellano, a programmer at St. Anthony Hospital, checks out new Criterion 8570 system.

Via Special CRT/Keyboard

Patients Enter Data Into Hospital's Mini

By Esther Surden
CW Staff

CHICAGO — Patients at Roosevelt Memorial Hospital here enter their own patient histories into a minicomputer-based system via a specially designed CRT, according to Jim Garthwait, director of information for the hospital.

The 144 bed not-for-profit hospital runs a complete patient care system on a 72K Four Phase Systems, Inc. IV/70 minicomputer with eleven CRTs, a 300 line/min printer and two cartridge disks.

After admission, the patient sits down at a terminal and takes his own history. The patient is accompanied by an historian who guides him through the process. A plastic template fits over the keyboad so the patient can only access the 10 numeric keys and two other keys that trigger "next question" and "go back." About 212 questions are asked of the patient, but all of these are asked only if the answers to every question is yes, Garthwait explained.

"Most of the answers to the questions are 'yes,' 'no,' 'I don't know,' or 'I don't understand.' There are a few in which the patient has to give a specific number."

After the patient keys in the information, the historian interviews the patient and asks for information on medicines the patient is currently taking or medicine-related allergies. With this information the historian adds a narrative part to the history. The system then prints out a narrative of the answers the patient gave, which, along with the admitting form, goes into the patient's chart.

Patient History System

The hospital's system of letting the patient "take" his own history began when a group of doctors got together and devised a patient history system on a Digital Equipment Corp. system.

The hospital needed more capability than the DEC equipment could provide and got in touch with a local consulting firm to devise the patient care system, he said.

The system begins to track a patient even before he is physically in the hospital, Garthwait said. Before the patients arrive at the hospital many go through a pre-admission procedure.

When a reservation is received from a doctor an admitting person calls the patient and enters all pertinent information so when the patient comes into the hospital, the record can be recalled, a permanent number provided and the admit date entered.

After the patient history is taken, the patient is put through a battery of lab test. As the technicians in the lab finish the tests, they enter the results on a CRT. As soon as the tests are entered the doctors or nurses have access to them through CRTs on the floor. Hard copies of the test results are printed twice a day, once at 3 p.m.and once before midnight, he said.

An X-ray reporting application is also part of the system, he explained. At Roosevelt, and at many other hospitals, standard narratives are used to describe normal X-rays. The X-ray department at Roosevelt had a typewritten list of about a hundred of the standard narratives, which the DPers have now put on disk.

"That took care of about 40% of the X-ray results that the hospital was reporting," Garthwait explained. The rest are keyed directly into the system.

The day after the patient is admitted, a utilization coordinator receives a report. The coordinator codes the patient's diagnosis into the system, and the system calculates "what the patient's length of stay should be." That triggers a census report for doctors.

When the patient is ready for discharge an admitting clerk enters the final diagnosis and the discharge status. A patient is kept on-line for two weeks, a length of time that is simply a function of system capacity, he noted.

Each night between 11 p.m. and 12 a.m. the hospital's switchboard operator takes the system off its on-line status and switches it to batch to print reports. "One of our design criteria was that the system should operate without DP personnel," Garthwait explained.

Because of the interest generated by the system, the hospital set up a company to market the software called Medical Computer Applications Corp. with which Garthwait is now involved, he added.

DEC MSB-11 Lets Students Use Mark Sense Batch Input

MAYNARD, Mass. — The Mark Sense Batch-11 (MSB-11) from Digital Equipment Corp. is an instructional batch processing system that allows student prepared marked cards, coded in either Basic or Fortran IV, to be used as input.

DEC MSB-11

The PDP-11/04 based system includes 32K bytes of semiconductor memory, dual floppy disk, 180 char./sec line printer, LA 36 Decwriter II console terminal and the CMS-11K desktop mark sense card reader. Basic is included with the system, while Fortran is optional, a spokesman added.

The CMS-11K reader enables the system to accept 40-column punched or marked cards. The system can be expanded to full RT-11 capability which allows it to run multi-user Basic in a timesharing environment alternately with mark sense batch, the company noted.

In addition, current PDP-11/34 users who have floppy disk storage can add the stand-alone mark sense batch capability through the introduction of a system enhancement package.

The system, with a subset of the RT-11 operating system costs $21,460. With the replacement of the desktop reader with DEC's standard CM-11 card reader the system costs $25,260, according to a spokesman. DEC is located in Maynard, Mass. 01754.

IBM Peripherals Linked to Minis

HOUSTON, Texas — Information Products Systems, Inc. has a device it says allows high performance IBM peripherals to hook up to a medium scale minicomputer.

Called the Selector Channel Emulation Unit (SCEU), it generates the protocol sequences required by the IBM peripheral control unit in response to the operational commands of the minicomputer CPU.

The unit can support up to 255 different device control units at combined transmission rates in excess of 2.4M byte/sec, the company claimed.

A typical system configuration includes a minicomputer, general purpose interface SCEU, Selector channel bus, IBM device control unit and the IBM or IBM-compatible device. The SCEU costs $15,150 with discounts available. The company is located at 6565 Rookin, Houston, Texas 77074.

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Typical systems for database management applications range from $100,000 to $350,000, or about $2,170 to $7,600 per month if leased directly from Prime.

To find out how being on-line to a Prime computer can keep you off the carpet, talk to Robert P. Berkowitz, vice president of manufacturing, Prime Computer, Inc., 145 Pennsylvania Avenue, Framingham, MA 01701, (617) 879-2960.

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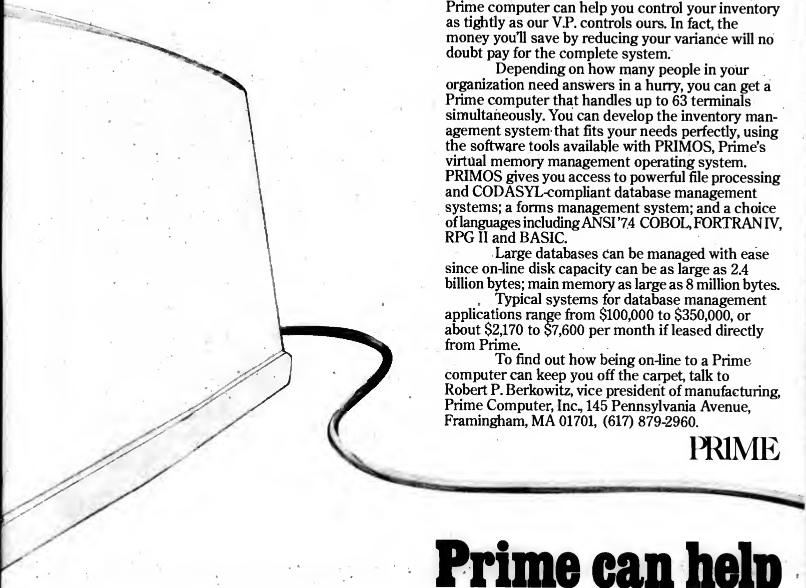

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Datapro Offers Selection Course

DELRAN, N.J. — A course in selection and usage guidelines for minicomputers and microcomputers will be given in four cities this fall and winter by Datapro Research Corp.

The course is intended for people with systems or administrative responsibility for planning and designing business information systems. Anyone responsible for evaluating, specifying, buying or using minicomputers and microcomputers will benefit from taking the course, Datapro said.

Included will be evaluation guidelines and competitive comparisons of existing vendors' product lines and business methods, the company said, as well as discussions of the relative value of vendor features and system integration capabilities.

The course costs $425 for current Datapro subscribers and $475 for nonsubscribers and will be given in Chicago Sept. 29-30, New York Oct. 13-14, San Francisco Nov. 17-18 and Washington, D.C. Dec. 12-13. Information is available from Peggy Quinn, Datapro, 1805 Underwood Blvd., Delran, N.J. 08075.

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Digital Pathways Eprom Fits DEC PDP-11 Minis

PALO ALTO, Calif. — Digital Pathways, Inc.'s RMP-116 board, designed for the Digital Equipment Corp. PDP-11, holds up to 16K of read-only memory (ROM) and contains an on-board programmer, according to a spokesman.

The device is said to allow users to place large programs in read-only memory, replacing disks for this function, thus enhancing speed and reliability.

The system is based on the Intel 2716 UV erasable programmable ROM (Eprom) or its masked equivalent 2316 ROM. It can plug directly into a peripheral slot on the PDP-11.

The unit accommodates direct and indirect addressing modes. In direct mode, memory is organized as a set of four blocks containing 4K words. Any block or combination of blocks can be assigned to unused portions of the PDP-11 address space, the company explained.

In indirect mode, all words on the board can be individually or sequentially accessed through a common port having a single peripheral address.

The RMP-116 board and programmer costs $895 and ROM chips are available from various suppliers, a spokesman added from Digital Pathways, Inc., 4151 Middlefield Road, Palo Alto, Calif. 94306.

Turnkey Suits Fuel Dealers

SCOTIA, N.Y. — A minicomputer-based turnkey system for fuel dealers is available from Mohawk Computer Technology, Inc. (MCT).

The on-line, interactive Fuelnova system was designed for fuel dealers with any number of accounts, the firm said. The system is modular and is configured to each dealer's needs.

It can handle transactions for payments, charges and no charges, as well as schedule deliveries using any one or combination of three alternatives with credit-checking capabilities, the firm said.

Management reports covering aged trial balances, sales analysis, budgets and performance can be produced by the system, according to MCT.

The Fuelnova system is comprised of a Data General Corp. Nova 3 CPU with 32K words of memory; a 60 char./sec serial matrix printer; a 10M-byte Novadisk with 5M bytes of fixed and 5M bytes of removable storage; and one or more CRTs.

Prices for a typical system range from $32,000 with one CRT to $36,000 with three CRTs. MCT is located at 8 Sarnowski Drive, Scotia, N.Y. 12302.

Add-On Gives Up to 32K Bytes

MINNEAPOLIS — Fabri-Tek, Inc. has a semiconductor add-on memory for the Digital Equipment Corp. LSI-11 and PDP-11/03 minicomputers.

The LS-IN-11 is said to provide 8, 16, 24 or 32K bytes of memory on a single card using 8K or 16K dynamic metal oxide semiconductor N-channel chips.

The unit uses a two-wide connector and plugs into a single chassis slot position. It is hardware- and software-compatible with the mini and memory segments are switch-selectable.

A 16K add-in memory costs $1,085 from the firm at 5901 S. County Road 18, Minneapolis, Minn. 55436.

Computer Labs Has Mag Tape

GREENSBORO, N.C. — Computer Labs, Inc. has a magnetic tape memory system for the Digital Equipment Corp. PDP-11 minicomputer. Called the T9000, the 75-in./sec magnetic tape transport permits PDP-11 system integration without any software changes, the firm claimed.

The 9-track PDP-11-compatible controller is available in either an 800 bit/in. NRZI version or one incorporating both NRZI and 1600-bit/in. phase-encoded formats. It runs RSX-11, RT-11 and DOS operating systems unaltered and is also TM11/TU10-compatible on commands and status interrupts, it said.

The 800 bit/in. T9000 costs $8,350 from 505 Edwardia Drive, Greensboro, N.C. 27409.

LSI-11 Gets Eprom Board

BELTSVILLE, Md.— RDA, Inc.'s RMRV-8K is an 8K-word erasable programmable read-only memory (Eprom) board designed for use with the Digital Equipment Corp. LSI-11, according to a spokesman.

The memory board occupies one dual-height module slot in the LSI-11 backplane, he noted. Addressing is jumper-selectable for any two 4K banks in the zero to 28K address space, he added.

The RMRV-8K costs $285, depopulated, from the firm at 5012 Herzel Place, Beltsville, Md. 20705.

Mini Bits

DG User Group Sets Fall Meet

WESTBOROUGH, Mass.— Data General Corp. has announced its plans for its annual users group meeting.

The meeting will take place in San Francisco on Oct. 26-28. Users can choose from concurrent seminars dealing with communications, languages and hardware as well as application case histories.

DG users with questions or suggestions concerning the meeting are urged to contact John Maloney, Data General Users Group, 15 Turnpike Road, Westborough, Mass. 01851.

Distributed DP Course Set

NEW YORK — A course on distributed DP using minicomputers and data bases will be given by Advanced Management Research International, Inc. in Boston on Oct. 3-5 and in San Francisco on Oct. 26-28, a spokesman reported.

Designed for DP managers, systems analysts and corporate management concerned with or responsible for developing the DP services within their organizations, the course will attempt to provide users with "what you need to know" to make decisions.

The course costs $495 for an individual registrant and the group rate for two or more persons is $425. AMR can be reached at 1370 Ave. of the Americas, New York, N.Y. 10019.

TI Cuts 900 Series Prices

HOUSTON — Texas Instruments, Inc. (TI) announced maintenance price reductions across all product lines of its 900 series mini/microcomputers and systems, effective Aug. 1.

Maintenance price reductions averaged 22% for the 990 family and 20% for the 900 series.

TI's Digital Systems Division can be reached through M/S 784, P.O. Box 1444, Houston, Texas 77001.

Seminar to Cover Minis In Health Care Settings

NATICK, Mass. — International Management Services, Inc. will present a seminar on minicomputers for health care applications in Boston on Oct. 26-28.

The seminar will strive to present a basis of comparison for evaluation of various products and techniques. Firm guidelines will be given for the evaluation and management steps will be recommended for analysis, design, selection and installation of minicomputers.

The seminar costs $395 for each prepaid attendee and $445 for billed attendance. Additional people from the same organization can attend the seminar for $425, IMS explained from 215 Oak St., Natick, Mass. 01760.

Correction

English 210, an option available on STC Systems, Inc.'s Ultimacc business system [CW, Aug. 15, Page 33], costs $5,000 to purchasers of that system. It is included as a standard part of the firm's Wholesale Distributor package in the bundled price which starts at about $43,000 including hardware and software, according to a spokesman.

A Source of Micro Bugs

'Noisy' Electricity May Plague Hobbyists

By Michael E. Zeidler
Special to CW

MILWAUKEE, Wis. — Many microcomputer hobbyists are discounting the quality of residential electricity as a source of computer "bugs." Purity is being ascribed to the electricity that is fed to the micro, but this confidence by hobbyists is not justified.

Transients in the electrical power supply are responsible for many mysterious microcomputer bugs.

Quite likely, each of the over 25,000 hobby micros in the country have been tripped into electricity by "noisy" electricity. Many of these errors, being non-repeatable, are getting chalked up and forgotten.

Some of these microcomputer bugs can be directly traced to transients in electrical power supply lines. Loading failures, media-to media transfer errors, memory loss and other 'glitches" may be symptomatic of power quality problems. These transients, which cause the quality of electricity to deteriorate, are introduced by competing appliances, neighborhood users and district surges.

The first time a hobbyist suspects power quality problems may occur when the microcomputer is competing with a dish washer, washing machine or power tool for electricity.

The micro might behave erratically and might refuse to load a tape or might jump to a different routine. The problem will clear up when the competing appliance is in the middle of a cycle and then reappear anew during the next cycle switching.

Transients are also related to neighborhood usage characteristics. A typical pole transformer usually supplies several buildings, some of which might contain heavy equipment which pollutes the electricity with spikes. The problem may be compounded by an insufficient rating on neighborhood pole transformers.

Microcomputers are also affected by brown-outs during periods of peak usage. During a brown-out a utility cuts voltage levels by 5% to head off a black-out.

Since the speed of the clock in the micro is a mathematical function of the input voltage, the clock may slow down during a brown-out, which could cause problems such as I/O transfer errors.

The hobbyist has little or no control over the quality of the electricity that is being consumed by the microcomputer. There is no control over the brown-outs and transients introduced into the neighborhood electrical supply. The hobbyists' control is limited to non-automatic appliances in the hobbyist's residence.

The hobbyist must adopt a defensive strategy to assure reliable microcomputing. The enthusiast can take six preventative steps:

- Recognize the possiblity of harmful transients in the residential power supply.
- Avoid competition between the microcomputer and domestic appliances.
- Avoid computing during peak demand periods or during brown-outs.
- Select large system power supplies.
- Use voltage spike protectors and isolation transformers.
- Identify the source of local transients.

Defensive action will help to minimize the impact of power quality problems.

Ziedler is an independent computing consultant and may be contacted at 2854 North Cramer St., Milwaukee, Wis. 53211.

Micro Bytes

'Shacks' to Retail 8080A Chip

FORT WORTH, Texas — Radio Shack Co. has announced that it will be retailing an 8080A microprocessor unit chip in its stores.

The chip comes housed in a standard 40-pin dual-in-line package and sells for $17.95, the spokesman said.

Heath Offers Catalogue

BENTON HARBOR, Mich. — The latest edition of the Heath Co. catalogue lists 400 electronics projects and features the Heath H8 and H11 microcomputers.

The catalogue is free from the company, Dept. 350-420 at Benton Harbor, Mich. 49022.

EPA Offers Micro Kit

SAN DIEGO — Electronic Product Associates, Inc. (EPA) is offering its Micro-68 computer in kit form at $385 complete with power supply and cabinet.

The kit includes a 6800 microprocessor, 16-key hexidecimal keyboard and six-digit display.

Memory can be expanded from the 128 words of random-access memory included to 768 words.

The MON-1 keyboard operating system is supplied in programmable read-only memory form.

EPA is at 1157 Vega St., San Diego, Calif. 92110.

Kit Has Basic

HIRAM, Ohio — Ohio Scientific has introduced the Challenger IIP, a 6502-based microcomputer that comes complete with Basic.

Challenger IIP comes with keyboard and interface to connect to a CRT.

The unit, with 4-slot backplane and case costs $598 from the firm in Hiram, Ohio. 44234.

Starting A Store

BOSTON — Consumer Computer Marketing, Inc. (CCM) has released a report, "How to Start a Computer Store and Keep it Running.

The package includes a 175-page manual and features an audio cassette transcription of the three-hour session presented at this year's National Computer Conference by Paul Conover, a consultant with CCM.

The report sells for $200 from the Audio Visual Dept., CCM Inc., P.O. Box 7343, Oakland, Calif. 94601.

PCC Offers Reference Book On Personal, Home Computing

By Frank Vaughan
CW Staff

MENLO PARK, Calif. — The People's Computer Co. (PCC) has recently published "PCC's Reference Book of Personal and Home Computing."

The volume contains 10 articles dealing with personal and home computing .The subjects range from a simple glossary that is subtitled "How to Translate Computer People Talk into Near-English;" an overview of personal and hobby computing; a discussion of languages; version three of Palo Alto Tiny Basic and the future of personal computers.

In his preface to the first article, "An Elementary Introduction to Home Computers for the Complete and Absolute Novice" Dwight McCabe, editor, says:

"The computer world can seem like a very strange and forbidding place to the non-initiate who unexpectedly stumbles across it, Computer people seem to enjoy adding to this aura by using an intricate jargon that often seems more related to Hungarian or Urdu than to English. In the past, an introduction to computers for most people resembled being grabbed by the neck and belt and being thrown bodily into a pool. After a period of complete confusion and even despair, everything usually clicked and made sense. Sadly, some drowned."

In the reference portion of the volume, McCabe provides two bibliographies, one general and one on computer music. He also includes membership information on the Association for Computing Machinery (ACM) and the Institute of Electrical and Electronics Engineers, Inc. (IEEE).

In addition, over 200 U.S. and foreign computer clubs are listed along with the club newsletters. Information on hobbyist publications, stores and companies is also included.

The reference book costs $5.95 plus 95¢ for shipping and handling per book. California residents must add 35¢ for sales tax. PCC, 1263 El Camino Real, P.O. Box E, Menlo Park, Calif. 94025, is a chartered, non-profit organization which also publishes three magazines: Dr. Dobb's Journal of Computer Calisthenics and Orthodontia, People's Computers and Computer Music Journal.

ACM Plans Hobbyist Group

NEW YORK — The Association for Computing Machinery (ACM) has formed a special interest group on personal computing (SIGPC). It will be operated exclusively for educational and scientific purposes in the design and applications of computer systems for personal uses, according to a spokesman.

Dr. Portia Isaacson, who chaired the 1977 National Computer Conference, has been appointed chairperson of SIGPC. Isaacson's immediate plans include appointment of other officers, publication of a quarterly newsletter and holding SIGPC's first business meeting at ACM '77 in Seattle Oct. 17-19.

Persons interested in joining SIGPC should write to ACM at P.O. Box 12105, Church St. Station, New York, N.Y. 10249. The dues, which include a subscription to the newsletter, are $5/yr for members, associates and student members of ACM; $13/yr for non-ACM members and a newsletter subscription without membership costs $12/yr.

Further information on SIGPC programs may be obtained from The Micro Store, 634 South Central Expressway, Richardson, Texas. 75080.

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FOR SALE. IBM 2741 PRINTER. Contact Jack Leng, (513) 258-1450, ISYS. 4134 Linden Ave., Dayton, Ohio 45432.

Axiom Plotter/Printer Bows

GLENDALE, Calif. — A graphic plotter/printer designed to operate on microprocessor based systems is available from Axiom Corp.

The Axiom EX-810 is a full graphics plotter which can print 8,192 dot/sec with up to 512 dot/row. It can function as an 80 column alphanumeric printer with a speed of 160 char./sec.

The unit is intended to be driven by an 8-bit MPU with relatively minimum software overhead and it is equipped with a TTL compatible controller which takes care of all the internal timing functions necessary to drive the printhead and advance the paper, the spokesman added.

Printout is initiated by a single input command which causes the eight-track non-impact printhead to move across the printing field, he said.

The unit costs $795, is self-contained in a case with power supply, paper holder, low power detector and bell. It uses 5-in. wide electrosensitive paper, the spokesman noted from 5932 San Fernando Road., Glendale, Calif. 91202.

N.Y. Hobby Show Planned

NEW YORK — A microcomputing trade and hobby show is scheduled for Oct. 28-30 at the Coliseum here.

Speakers and experts to fill the seminar agenda are being provided by "Byte," the small systems journal. Topics will include items of interest for persons who range from the novice to advanced levels of microcomputing, according to Manfred Peschke, publisher of "Byte."

Manufacturers have, he said, been invited to explain their microcomputer systems along with the experts who will conduct forums on algorithms, software, language compilers and assemblers.

The personal design of microcomputers, kit building and applications are among the topics to be included.

Three-day tickets cost $13, two-day tickets sell for $9 and a one-day admission will cost $5. The show is being produced by H.A. Bruno & Associates, 78 East 56th St., New York, N.Y. 10022.

AJ Set to Sell Used Terminals

SAN JOSE, Calif. — Anderson-Jacobson, Inc., is offering a refurbished terminal at one-fourth its original cost.

Offered is the AJ 841, an IBM Selectric-type terminal and off-line typewriter that originally sold for over $4,000, according to a spokesman.

The terminal is being sold at an introductory price of $995 plus shipping. It will regularly sell for $1,195 from Steve Trillo at the firm's 521 Chariot Ave. office, San Jose, Calif. 95131.

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This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

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Sought Countermeasures

IBM Feared Competition to 360/30 CPU

By Molly Upton
CW Staff

NEW YORK — In 1964 IBM's System 360/Compatibility Committee foresaw competition from independent manufacturers' peripheral equipment and considered likely the appearance of a 360/30 compatible CPU, according to a committee memo on Aug. 21.

The report considered integrating various devices and tying in programs with read only memory as ways of countering possible competition.

The committee found that the 370/30 market presented the greatest potential for a competitive compatible system, according to the memo which was introduced as evidence in the U.S. vs. IBM antitrust trial here.

"A 'super' Model 30, completely compatible, with a price/peformance superior to the Model 30 may be announced by a competitor in late 1965 or 1966," the report continued.

IBM saw competition in the peripheral area coming from both independents and divisions of computer manufacturers, both of whom "are in a position to market devices of comparable IBM capacities at approximately 20% less price," according to the report.

In addition, these firms were likely to heavily market these peripherals to the federal government, IBM indicated.

IBM thought the competition would be in the areas of tape drives and terminals.

The report estimated there would be about 14,600 installed 360/30s by 1970, far more than any other 360 model.

Any direct competitor of the 360 line would have to use integrated circuits, the committee indicated, and it might be "possible to 'leapfrog' IBM because integrated circuitry will be available in the time period under consideration."

The competitive task force saw a problem in motivating engineers to directly copy a machine. "The job of directing engineers to slavishly copy a system when they can see many ways to make improvements on it is a formidable one."

The report considered the possible situations and approaches of three hypothetical firms entering the 360 compatible market and concluded "successful competition to the 360 on a compatibility basis is no easy task."

Among the problems was the question whether the price of integrated circuitry would be low enough by the desired date.

There were also problems in undercutting IBM's price, IBM speculated. "It appears difficult to provide a system with greater performance and more features than the Mod 30 at such a price and still get a suitable profit."

IBM Trial Documents

The most likely solution regarding file compatibility would be to use IBM files.

"This introduces the two vendor problem, a diminishment of the price/performance gained by cheaper competitive I/O, and an additional level of complexity in replacing Mod 30s which run under the operating system or which have file-oriented applications," the report stated.

It would also be a problem to offer an entire range of systems that would compete with IBM's offer of upward and downward mobility, IBM indicated.

And lastly, any potential competitor would have to reckon not only with IBM, but also possibly with other entrants in the same plug compatible CPU market, according to the study.

To Minimize Exposure

To minimize the potential exposure of the Model 30, the committee suggested IBM investigate the following possibilities:

- Programming systems tied in with read only memory.
- Emphasis on 2311 file for 16K programming system support.
- Improved scientific performance of Models 30 and 40,
- 1401 compatibility mode,
- Improved throughput through I/O developments,
- Evaluation of solid logic technology (SLT) vs. integrated circuits.

(Continued on Page 40)

Mini, Micro Peripherals Market Placed at $37 Billion in 1986

By Toni Wiseman
CW Staff

NEW YORK — Minicomputers and microcomputers are predicted to reach a cumulative market of $30 billion by 1985.

By the following year the minicomputer peripherals market will total $37 billion cumulatively, with minicomputer software totaling $3.4 billion over the same decade, according to Frost & Sullivan, Inc. (F&S), a market research firm here.

"Software and peripherals have become the most profitable portions of a minicomputer system," the report stated.

F&S found that there are some 200 independent companies which currently produce miniperipherals in addition to the minicomputer mainframers themselves.

And, competition among the mini manufacturers, independent peripherals companies and software houses is extremely fierce, with all three groups soon to be supplying complete turnkey systems, it said.

The battleground has particular significance to the independent peripheral company, F&S said, because "it will have to incorporate either a minicomputer or microcomputer CPU into its own product line and sell a complete computer system or else be at the mercy of the CPU manufacturer."

This fact might explain Pertec Computer Corp.'s recent acquisition of Mits, Inc., it suggested.

During the next decade, the largest dollar sales will be in alphanumric display terminals, printers and magnetic disks, which together represent over 50% of total miniperipheral dollar sales, the report said:

The alphanumeric display terminal's large sales are due to its use as a major on-line data entry unit which replaces batch processing with transaction type processing, it said. With the trend toward multiple terminals, F&S predicted the number of units sold in 1986 to jump to 2.8 billion units valued at $1.13 billion, compared with 150,000 units valued at $150 million in 1976.

"The floppy disk, and the one-million byte mini disk, have opened computerization to the small businessman and will see annual sales increase from a present $100 million to

(Continued on Page 40)

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IBM Planned to Counter 360/30 Competition

(Continued from Page 39)

Looking at the I/O competition, the committee recommended IBM institute:

- Reviews of all policy and contract changes from marketing as well as financial aspects,
- Development of price/performance improvements in the data storage device area,
- Increased reliability and human factors designed in I/O equipment,
- Study of ideas for integrating devices, programs and possibly, diagnostics so customers will favor IBM terminal devices,
- The continued practice of disclosing interface specifications only after the final specifications test.

Thus in 1964 IBM was thinking of several ways of integrating its systems to thwart competition.

Tying in programming systems with read only memory would make direct replacement of the system more difficult, IBM said.

If the 16K version of the 30 used an operating system via the 2311, this could make replacement inherently more difficult, the committee explained.

And linking users to the 1401 could also thwart users from switching to other machines. This could be done through a one-time charge or free provision of a 1401 compatible mode or a program switch which would allow intermixing of 1401 and 360 programs under an operating system, the report stated.

If substantial inroads were made on the 30 base, a model 25 which had full compatibility, not just subset compatibility, with lower performance and lower price "would retain for IBM many installations exposed by price alone rather than by price/-performance," the task force said.

Mini Gear Mart Growing

(Continued from Page 39)

$215 million by 1986," the report projected.

Higher capacity magnetic disk cartridge/disk pack sales will increase from $375 million annually to $1.4 billion over the decade, with ten-year sales exceeding $8 billion, F&S stated.

Printer sales will increase from 44,000 units valued at $300 million in 1976 to 280,000 units valued at $1.3 billion in 1986, for a ten-year market of $6.7 billion, the report predicted. The majority of these will continue to be serial printers throughout the decade, though faster (over 600 line/min) printers will begin to gain popularity.

"The add-on memory, which isn't considered a mini-peripheral today, may eventually perform the auxiliary storage function when its cost/performance ratio improves. However, while we see the add-on memory increasing due to user desire to expand present systems, its impact as a major storage medium is not envisioned in the foreseeable future," the report observed.

Add-on sales were projected to grow from 22,000 units valued at $110 million in 1976 to 150,000 units valued at $325 million in 1986. Total sales over the decade should amount to $2.16 billion, the report indicated.

"Software sales for the minicomputer will be basically application program packages for the small businessman who needs to have the computer manufacturer or software house perform programming," F&S said.

Total sales for minicomputer applications packages will exceed $575 million in 1986, reaching a ten-year total of $2.8 billion, it stated.

While system software will have lower sales, it will nonetheless grow from $30 million in 1976 to $75 million in 1986, with a ten-year total of $525 million, the report predicted.

"The minicomputer software market, due to the basic need for customization to each user's requirements, will still be the prime area for the independents.

"No one company, or small group of companies, has the capability to meet the software needs of each possible application and subapplication area.

"The small businessman needs to establish a personal relationship with the vendor. For that reason, the independent company will retain the most significant share of this market," F&S stated.

The study noted that minicomputer manufacturers now regard software as a key computer element, and expect profits on it to make up for low hardware costs. "Software is the wedge they use to differentiate one system from another," it said.

All of this has prompted minicomputer manufacturers to substantially increase software development efforts and to restructure software marketing. The practice of licensing software so that a customer pays monthly payments is spreading throughout the industry in contrast to the previous practice used by computer companies to charge a one-time licensing agreement, according to F&S.

In addition, most companies offer only short warranty periods on the software and do not back up the product against defects over the life of the package.

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The Schedule for the 1977/78 Series is:

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October 27, 1977 Palo Alto, CA
November 17, 1977 Houston, Texas
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Amdahl Stock Swings Up After IBM Announcement

SUNNYVALE, Calif. — The price of Amdahl Corp.'s stock has soared from 30-1/2 on Aug. 3, the day after IBM announced the delivery schedule for its 3033 processor, to 41 on Aug. 24. And it is still climbing.

One analyst noted that Amdahl stock earned $1.70 a share last year, compared with a loss of $6.29 for the previous year. In the first quarter of this year earnings were 69 cents a share compared with 18 cents a share in the year-ago quarter.

"I don't think there's much stopping them in the near future," he declared.

Gene Amdahl, president of the firm, said he attributes the stock's recent upswing in part to the IBM announcement and in part to the fact that security analysts have finished analyzing the firm's second quarter results and feel better about his company's prospects.

Harry Edelson, vice-president of research with Drexel Burnham Lambert, Inc., a brokerage firm, agreed the financial community feels better about recommending Amdahl stock for several reasons.

First, Amdahl will be doubling its manufacturing capabilities in the next six to eight months. "It's had enormous gains with just manufacturing five computers a month. It'll probably go to 12/month within a year and from that you could certainly do some extrapolation," he said.

Amdahl has also been able to hold its margins level after the 3033 was announced, Edelson noted.

Manufacturing Source

In addition, Amdahl now has an alternative manufacturing source — itself — which means it no longer relies solely on Fujitsu Ltd., which spread the risk thinner, Edelson said. And, where it used to have to carry a lot of spare parts inventory and three or four people for each installation, it is now able to save on these areas as more systems are sold, he added.

Finally, Amdahl plans to start building computers in Ireland. This will ameliorate its tax rate since it will have a favorable tax position there for a number of years, he said.

"I think that stock market-wise; if IBM annouces a 3032 and/or 3031, there could be a stock market impact on Amdahl — it may only be brief.

"I'm not sure it would affect its operating statement, but Amdahl is a speculative stock in that it's small, growing rapidly and you always have to be concerned about potential announcements from IBM and their effect, not so much on operating results, but on stock price," Edelson stated.

He suggested that Amdahl's impact on IBM has been "overdone.

"Just as IBM is taking some of the excess demand in the minicomputer industry, maybe Amdahl is doing the same thing in the mainframe area," he said. He estimated that 75% of Amdahl sales are additive, not replacements.

Amdahl basically agreed, saying he did not feel Amdahl had hurt IBM in any way, but rather was filling orders IBM could not fill because of production capacity limitations.

In other words, his firm is not, in the short term, stealing orders from IBM. But they are probably orders which, in the long term, would have been filled by the giant.

Update to Focus On Semi Impact

PALO ALTO, Calif. — The far-reaching impact of rapid advances in semiconductor technology will be highlighted at "Technology Update for Executives," to be held Sept. 25-30 at the Naval Postgraduate School in Monterey, Calif.

The conference is cosponsored by the Naval Postgraduate School and the Western Electronics Manufacturers Association (Wema), the trade association for the electronics industries.

The week-long program features intensive courses conducted by experienced educators from the Naval Postgraduate School and specialists from industry.

Registration is open to nonmembers as well as Wema members. For information contact Wema at 2600 El Camino Real, Palo Alto, Calif. 94306.

Adapso Sets Analysts Meet

MONTVALE, N.J. — The Association of Data Processing Service Organizations (Adapso) has scheduled its fourth annual financial analysts meeting for Sept. 27 at the Biltmore Hotel in New York.

At the meeting, International Data Corp. will present its recently completed marketing, financial and statistical survey of the computer services industry.

In addition, the meeting will feature a series of talks dealing with the current status and future of the industry as it relates to whether IBM will reenter the services market.

Speakers include Charles Lecht, author of "Waves of Change" and president of Advanced Computer Techniques Corp.; Robert E. Weissman, president of National CSS, Inc.; and Nancy Scull, director of corporate planning for International Data Corp.

Adapso is at 210 Summit Ave., Montvale, N.J. 07645.

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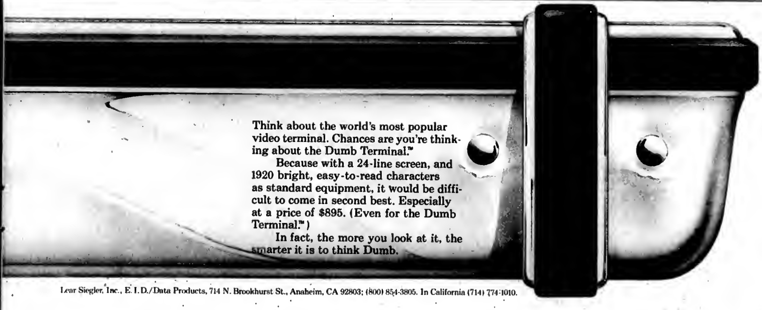

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Turkish DP Arena Found Sluggish, Growing

ANKARA, Turkey — The first modern computer entered Turkey in 1961, but there is yet no established Turkish information processing policy, according to a study by the U.S. Department of Commerce.

The Turkish electronics industry currently is limited mainly to assembly operations though efforts are being made to establish a full range of manufacturing facilities. Presently, U.S. firms supply about 90% of the country's computer requirements, Commerce said, noting that business and industry generally are more receptive to computer utilization than is government.

Commerce expects computer imports, which are currently running at about $5 million a year, to grow slowly over the medium term to about $8 million a year, due to financial as well as technological limitations.

International News

Since there is no established information processing policy, computer projects sometimes surface suddenly on an ad hoc basis. However, the State Planning Organization (SPO) is preparing legislation which will formulate a general information policy for the country, Commerce said.

At present, SPO also studies, coordinates and approves computer procurements for the public sector, while the Union of Chambers of Industry, Commerce and Commodity Exchanges of Turkey performs this function for the private sector, according to Commerce.

The government-established Turkish Electronics and Trade Corp. (Testas) has plans to manufacture a wide range of electronic equipment including process control systems and computers. To that end, it is contacting international electronic manufacturing firms for technical assistance and licensing agreements, Commerce said.

"Currently, apart from this, there are no known serious licensing, joint-venture or manufacturing efforts in the area of computer equipment, although completion of DP systems is becoming popular through other equipment manufacturers' agreements, which some Turkish companies successfully employ," the study said.

Insufficient or poorly defined application and utilization standards, legislative problems, structural administrative difficulties, shortage of DP personnel, fear of personnel displacement and low government salaries are among the factors inhibiting increased computer sales in Turkey, Commerce suggested.

There are about 150 accounting machines installed in Turkey today, 87% of which were supplied by U.S. firms and 13% by a Turkish company through OEM agreements with various U.S. companies. There are also some 20 laboratory and special process control computers, located mainly in universities and scientific research organization — not in industry.

The installed base of general purpose computers is only 136 (93% U.S. — supplied), with the largest systems installed by the Turkish Armed Forces and two universities.

Commerce estimates that by 1982, the installed base should grow to 428 accounting machines, 28 laboratory and process control systems and 444 general purpose computers.

In terms of potential for growth, the most promising immediate potential for additional systems applications are business and financial planning, management sciences, manufacturing applications and branch bank mechinization, Commerce said. Additional banking/insurance utilization and broader university applications who potential in the medium-term (2-5 years), it added.

Foreign Orders & Installations

The Finnish Ministry of Education has ordered three Univac 1100/11 systems. The first two systems will be delivered to the Universities of Oulu and Tampere this year, and the third to the University of Jyvaskyla early in 1978.

The Ministry of Communications of India has ordered 30-channel pulse-code modulation equipment from Fujitsu, Ltd. The PCM-30 system will be delivered to New Delhi, Bombay and Poona this autumn, and will be in operation by the beginning of 1978.

The Voluntary Health Insurance Board of Dublin, Ireland has ordered a Model 62/60 system from Honeywell. The equipment will handle claims processing and policy renewals.

The University of the Bundeswehr Hamburg, operated by the West German defense forces, has ordered a Univac 1100/21 system, to assist in its training program.

The European Center for Medium-Range Weather Forecasts has ordered a Cray-1 system from Cray, Research, Inc.

The Dublin Savings Bank has ordered an NCR Corp. Criterion 8550 system to help accommodate the growth of its transaction-processing network.

Both the Johnan Credit Bank and the Yasuda Trust and Banking Co. of Tokyo have ordered Univac 1100/42 systems.

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Deadline for all submissions is October 21, 1977. Authors will be notified as soon as possible and no later than March 1, 1978 regarding acceptance. Please send your submissions to:

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CONFERENCE CHAIRMAN
Stanford Research Institute
333 Ravenswood Ave., L 1109
Menlo Park, CA 94025

or

Dr. Leonard Y. Liu
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IBM Research Laboratory
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Cassette Bows

NEWTON UPPER FALLS, Mass.— A cassette recorder that receives data at rates up to 500 word/sec is available from Memodyne Corp. for $1,630 in single quantity.

The 3773 may be used with microprocessor-based data logging, communication and process control systems as well as with CRTs, minis and keyboard printers, the firm indicated.

The unit contains a reel-to-reel transport drive with two moving parts and cards for servo functions, read and write, control and buffer.

Read and write speed is 20 in./sec and search and rewind speed is 100 in./sec.

Memodyne Corp. is at 385 Elliot St., Newton Upper Falls, Mass. 02164.

OEM Products

Range of Print Heads Announced

Infomag Offers Dot-Matrix Unit

GOLETA, Calif. — Information Magnetics Corp. has entered the data printer market with a dot-matrix head. The unit, designed as a replacement for the Victor unit, is a compact printer with a duty cycle rating up to 200 char./sec, according to the firm.

The head, which comes in models 120, 160 and 200, can be adapted to most dot-matrix data printers, according to the firm.

It has a 9 by 7 dot matrix with a rated life of 200 by 10^6 characters minimum, the firm said.

The head can print an original plus five copies of forms up to 132 characters wide.

The head costs about $100 when purchased in quantities of 10,000 from Information Magnetics Corp., 5743 Thornwood Drive, Goleta, Calif. 93017.

Unit Prints 3 Line/Sec

ELMSFORD, N.Y. — The PR2100 series of impact printers from Sheldon-Sodeco Printer Co. print at speeds up to 3 line/sec for numeric and 1.5 line/sec for alphanumeric.

The 21-column printers have "spanning hammers" that form characters for each group of three columns, which reduces the number of moving parts, the firm said.

Units use standard paper tape and cost $130 in quantities of 100 from Sheldon-Sodeco Printer Corp., 4 Westchester Plaza, Elmsford, N.Y.

Victor Has 110 Char./Sec Entry

CHICAGO — Victor Comptometer Corp. has unveiled a print head which it said represents a 20% improvement in duty cycle over the firm's previous model.

The 129-112 print head features a 7-wire dot matrix and prints at 110 char./sec. Weight is 9 oz.

In lots of 1,000, the unit costs $59.50 from the firm at 3900 N. Rockwell St., Chicago, Ill. 60618.

3350 Disks Get Clock Writer

SANTA MONICA, Calif. — Pioneer Magnetics, Inc.'s Clock and Sector Track Writer is designed to write the fixed-head timing track on the 3350 "Winchester"-type disk memories, the firm said.

The clockwriter is one model of Pioneer's PM 2390 series, which allows the writing of a closed clock track at bit rates as high as 24M byte/sec, the firm said. The instrument can also write custom sector and address patterns as well as open clocks with any gap length up to 100 microsec, Pioneer said.

The unit can also be used to measure frequencies to 25 MHz, measure amplitude and/or frequency modulation. It detects area or pinhole defects and measures track following servo performance. Other features include origin or index writing, simultaneous track writing, variable bit symmetry control and selection of sector and address patterns via front panel switch, the firm said.

The PM2390 costs $9,950 each with delivery in 90 days from Pioneer Magnetics, Inc., 1745 Berkeley St., Santa Monica, Calif. 90404.

Part & Parcel

SUNNYVALE, Calif. — Shugart Associates lowered prices on its SA400 minifloppy disk drive as much as 15% effective July 1.

The price for 500 drives is reduced from $250 to $215, for example, the firm said. The firm said it is in high-volume production of the units, shipping 1,500 to 2,000 drives a month, and expects to reach 4,000/mo by year's end. Shugart is at 415 Oakmead Pkwy., Sunnyvale, Calif. 94086.

• • •

Intel Memory Systems In-2010 is a static semiconductor memory card with read and write cycle time of 115 nsec. Maximum capacity of the card is 8K by 32 bits, plus a parity bit. The card is 11.75 in. by 15 in. and costs $2,850 in lots of five to nine. Intel Memory Systems is at 1302 N. Mathilda Ave., Sunnyvale, Calif. 94086.

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  - MVS operating thru-put.
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  - data base (IMS) performance measures.
  - TSO performance and turn around.
- participation in management presentations
- development of hardware/software plans
- development of hardware/software justifications.
- development of hardware/software written evaluations.

To Qualify:

- Bachelor's degree in Engineering, Mathematics, Chemistry, Physics, Computer Science or other discipline with at least 50 quarter hours in a combination of these subjects.
- experienced programmer:
  2-3 years of assembler programming at least 5 years' experience designing and/or programming computer applications.
- preferred experience:
  systems support programming - MVT & MVS previous programming CICS, VSAM, BTAM previous experience in TSO, CPS

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engineers

Software Integration Engineer

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As a Software Integration Engineer at Amdahl, you will participate in engineering software reliability testing and integration of hardware diagnostics and control systems programs for our 470V computer systems. You should have a knowledge of and experience with most of the following: computer organization, logic design, minicomputer operating systems, software reliability, and higher level and assembly languages (PL/1, 370 Assembler, NOVA Assembler preferred). You have an MSEE or a Computer Science degree with a minimum of 2 years' related experience. Please indicate 425-E on your response and direct it to Employment Manager, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086. We are, of course, an equal opportunity employer.

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Qualifications: Master's degree; 2 years, extensive experience with computing in higher education; experienced with IBM OS operating system & JCL; fluent programming in BASIC, FORTRAN & one other language.

Duties: Research, develop, implement & maintain new computer applications for academic disciplines; present workshops to university personnel on computer center functions and applications; provide support to instructional faculty; assist faculty & students in use of computing resources.

Contact: Send vita with qualifications and experience to: Director, Computer Center, Univ. of Northern Colorado, Greeley, CO 80639.

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Develop software for the exciting 990 Computer Family. Performing functional systems design of Software Projects. Requires implementation of operating systems, data communications, languages, data management and utilities. Will assume project management status after initial training and performance period. Aptitude in assembly language required. Familiarity with PASCAL desirable. BS or MS in Computer Science, mathematics, physics, or engineering with 4-10 years' experience.

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Take a career jump into the TI minicomputer software team. Duties will include the design and development of extensive systems level diagnostics software for 990 computers in a stand-alone and real-time environment. Excellent knowledge of assembly language programming, diagnostic software and digital logic design required. BSEE with computer science background and 3-7 years' related experience.

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Marketing Applications Engineers

Work in the forefront of new product development at TI. Duties include analysis of customer requirements and systems design. Direct daily communications in advising and counseling current and potential customers in TI's new distributed processing product lines. Individual will also develop demonstration packages and provide general technical and new product support. Software background, knowledge of digital communications and 3-7 years of directly related experience required as well as BSEE, Computer Science or related technical degree.

Product Planner

Duties would include product/marketing analysis for specific opportunities, conducting competitive analysis, developing specific marketability specifications and communications to management. Requires a BS in Engineering with an MBA preferred, and 4-7 years' experience with 2-5 years in the minicomputer or data processing industry.

Product Services Engineers

A career development opportunity in the support of new computer products from conception to field maturity. Duties will require coordination of service planning-maintenance philosophy, spares requirements, tooling, RMR, training and field installation and sustaining product until field and product reach service maturity by product end/or by account. Similar responsibility will include policy development for product maintainability, serviceability and test design. BSEE with a minimum of 2 years of design or sustaining of minicomputers or related peripherals.

Technical Writers

Experienced digital hardware and software technical writers are needed to join in the development of TI's rapidly growing minicomputer business. Electrical Engineers and computer programmers with good writing skills should also apply.

Send resume in complete confidence to: **Lee Cooke, Staffing Manager/P. O. Box 2909, M.S. 2106/Austin, TX 78769.**

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- **SYSTEMS PROGRAMMERS/EVALUATORS.** Knowledge of telecommunications, large scale IBM systems required. Internals & performance measurement helpful.

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SYSTEMS PROGRAMMER PROGRAMMER ANALYSTS (3)

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Please send your resume to:

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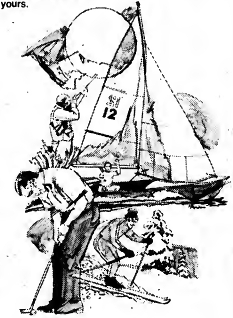

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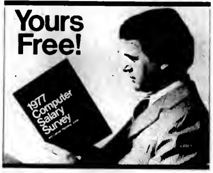

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(When writing, please be sure to indicate home address and current position title.)

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4 PM — 12 PM

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CIRCULATION DEPARTMENT

MANAGER COMPUTER OPERATIONS

We are a large IBM installation in the Cleveland area seeking an experienced professional to manage our computer data center.

The manager will be responsible for data processing operations, technical programming and data communication. Corporate data center computer equipment is third generation IBM 370 with virtual operating systems (SVS).

Successful candidate will possess a strong background in the computer operations and technical support disciplines, with in-depth knowledge of IBM operating system. Technical knowledge of data base concepts with 5 to 7 years of management experience necessary. Bachelor's degree desired.

Salary commensurate with experience, including a fully paid benefits package. Forward your resume, including salary requirements, in complete confidence to:

Mr. Kenneth L. Davis
Senior Personnel Specialist

Blue Cross
of Northeast Ohio
2066 East 9th Street
Cleveland, Ohio 44115

An Equal Opportunity Employer, M/F/H

® Registered Mark Blue Cross Association

SYSTEMS PROGRAMMER

Our Corporate Data Processing Center, located in Fullerton, California, has immediate openings for Systems Programmers to become actively involved in converting our present system software to a new virtual system software in order to exploit the power of our recently acquired Amdahl 470V/6 computer. In addition, we are in the planning stage for installation of a data network capable of switching remote users to any of the several host systems located throughout Hughes Aircraft Company.

Positions exist for experienced persons in the following areas of expertise:

- On-Line Systems Programmers with experience on at least one of the following IBM Subsystems: ATS, IMS, System 2000 or TSO.
- Operating Systems Programmers/Analysts with experience in installation and support of the IBM MVS operating system. In particular JES 2/JES 3 or systems measurement and performance tuning.
- System Planners with experience in evaluation and selection of data processing equipment in the areas of: DASD Storage, Tape Storage, Mass Storage, Intelligent Terminals.

Applicants should have demonstrated ability to formalize evaluations and present alternatives to management.

Positions exist at all experience levels. Candidate selection will depend on experience, capability, and self-motivation.

Qualified applicants should send their resumes to: Professional Employment, Department N-1, Ground Systems Group, P.O. Box 3310, Fullerton, CA 92634.

HUGHES

HUGHES AIRCRAFT COMPANY

U.S. Citizenship Required
Equal Opportunity M/F/HC Employer

---

programmers

Systems Programmers

Come to Amdahl on the San Francisco Peninsula for Creative Job Satisfaction.

Join the progressive staff at Amdahl's Corporate Computer Center on the San Francisco Peninsula, and enjoy working with the company's own 470 system running MVS and VM. Please direct your response to Phil Beckhelm, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, California 94086. We are, of course, an equal opportunity employer.

MVS SYSTEMS PROGRAMMER

You will be responsible for the generation, installation, modification, and maintenance of software on the Corporate Computer Center system utilizing MVS. This includes the SCP, JES2, TSO, program products and utilities. Extensive knowledge of VS2 internals and concepts in a production environment is required. Additionally, experience with VS2 utilities, Assembler Language, and SMP is a must. Direct MVS experience desirable. Please indicate 753-E on your response.

SYSTEMS PROGRAMMER

You will be responsible for performance and utilization monitoring for MVS and VM on the Corporate Computer Center system. This will include tuning of system and application software, load forecasting, and capacity planning. Extensive knowledge of VS internals and concepts, performance measurement, and tuning is a must. Additionally, experience with hardware and software monitors and SMF data reduction is required. Please indicate 753-E on your response.

amdahl

PERSONNEL SPECIALISTS.

Because of the continuing growth of Aramco in Saudi Arabia, the Aramco Services Company has increasing needs for persons with Employee Relations Systems expertise in our Houston, Texas office.

The job.

We are at the beginning stages of setting up a computer monitoring system that will allow us to improve our total personnel operation. We need a person who can function as our liaison with our EDP Department in this project.

If you have a background with on-line systems and a high level programming language such as FORTRAN, COBOL or PL/1, you may be the person we're looking for. You must also have been involved with the design and implementation of an on-line data/information system. This position offers excellent career opportunities in both the Personnel and EDP areas.

Your benefits.

Employment with Aramco offers career opportunities that include not only a good salary, but one of the best benefits packages in the industry.

Interested?

If so, and you're qualified, send us your resume and salary history. We'll be back in touch with you as soon as possible.

ARAMCO
SERVICES COMPANY
WRITE SECTION DOM, DEPT. CW1005A
1100 MILAM BUILDING, HOUSTON, TEXAS 77002

SOFTWARE PROFESSIONALS

Pertec Computer Corporation would like to discuss openings in Irvine, California

Our location is excellent. Our projects are challenging.
Our Company is dynamic (910 employees in 1976, 1924 in 1977).

LET'S TALK

Lon Atkins and Carlos Ramirez, Software Engineering managers, are manning our Software Hotline. They know the details of PCC's new and ongoing projects. Call them to discuss opportunities in the following areas:

- ★ **Operating Systems**
- ★ **Data Management**
- ★ **Compiler Development**
- ★ **Telecommunications**
- ★ **Software Troubleshooting**
- ★ **System Enhancements**
- ★ **Technical Writing**
- ★ **Software Test and Integration**
- ★ **Design/Proposal Evaluation**

THE COMPANY

Pertec Computer Corporation is internationally known as a leader in the computer industry. Our dedication to the design and manufacture of state-of-the-art computer products has resulted in the virtual doubling in size since 1976 of our Data Systems Operations Division in Irvine. All positions feature top pay plus our exceptional benefits program including medical, hospital, dental and long term disability insurances, stock purchase plan, profit sharing/retirement plan and up to 25½ paid days off during the year.

THE LOCATION

Irvine, California is located in suburban Orange County, 35 miles south of Los Angeles, 70 miles north of San Diego. The lifestyle includes 42 miles of public beaches, 11 colleges, excellent climate (average February temperature 60°) and a variety of cultural activities. Our many family-oriented communities offer a lifestyle opportunity to match your dynamic career objectives. Relocation will be provided for successful applicants.

If you feel these opportunities match your background and interests

LET'S TALK

Call Lon Atkins or Carlos Ramirez · SOFTWARE HOTLINE (714) 540-8340, Ext. 215

8:00 A.M. to 11:00 A.M. Pacific Daylight Time
Monday · Friday
Collect calls accepted. Local interviews will be arranged.

or Send Resume to:

17112 Armstrong Ave., Irvine, CA 92714

Equal Opportunity Employer M/F

PCC DATA SYSTEMS OPERATIONS
a division of Pertec Computer Corporation

DATA PROCESSING PERSONNEL

EG&G Idaho, Inc. the prime operating contractor to the Energy Research and Development Administration at the Idaho National Engineering Laboratory has immediate openings for:

SYSTEM ANALYSTS
SENIOR PROGRAMMERS
PROJECT LEADERS

Candidates should have a college degree, or equivalent, and a minimum of 4 years experience in the development and implementation of business and management information systems along with proven capability in ANS COBOL. Experience with MARK IV and/or DBMS and a knowledge of JCL for OS/MVT is desirable.

Idaho Falls, Idaho, is a medium sized community located close to top-flight winter sports areas (Sun Valley, Jackson Hole, Grand Targhee) and unexcelled summer recreational areas (Yellowstone, the Salmon and Snake Rivers, and the Grand Tetons).

If interested and qualified, please submit resume, including salary history and requirements, in confidence to:

Technical Employment

EG&G

EG&G Idaho, Inc.
P.O. Box 1625, Idaho Falls, Idaho
An Equal Opportunity Employer
U.S. citizenship required
We welcome responses from minorities/ females and Handicapped M/F

PROGRAMMERS -- ANALYSTS

DASD Corporation, a national consulting firm specializing in Software Product development and Contract Services, is planning to increase its staff considerably during 1977. Positions are now open in the following areas:

- Project Management
- Project Leaders
- Senior Analysts
- Programmer/Analysts
- Programmers
- DATA BASE CONSULTANTS

We are looking for people with experience in any of the following categories:

COBOL
ALC/BAL
RPG II
PL1
FORTRAN
IMS
TOTAL
IDMS
CICS
CFMS
OBOMP
IBM (DOS, OS, VS)
BURROUGHS
HONEYWELL
CDC

This is an excellent opportunity for the right individuals.

Benefits include Blue Cross Blue Shield Medical Ins., Life Ins., Disability Ins., Retirement Plan and an excellent salary.

We have offices in Milwaukee, Chicago, Houston, Los Angeles and Philadelphia. Expansion plans for other cities are also underway. We will relocate you to accommodate your career as well as DASD's plans.

Please call or send your resume to our Corporate Offices at:

DASD CORPORATION

9705 North Port Washington Road, Suite 301
Milwaukee, Wisconsin 53217
(414) 351-2000

ASSEMBLY LANGUAGE PROGRAMMERS

Due to recent growth, several vacancies exist for experienced Assembly language programmers. One to five years of Assembly experience in a scientific/military environment is required.

These positions offer a unique opportunity for interesting assignments and professional development in a consulting environment.

All positions are located in Newport, R.I. We offer attractive starting salaries, fringe benefits and relocation expenses.

If you qualify, please send resume and current salary to:

Newport Division
SYSTEMS CONSULTANTS INC.
10 John Clarke Road
Middletown, RI 02840

SCI SYSTEMS CONSULTANTS INC

An Equal Opportunity Employer

COMPUTER

Telefile makes computers work better and easier. Our company, a leader in the unlimited world of computer enhancement, has the rare opportunity for

- •**Diagnostic programmer with a minimum of 2 years experience in communications and assembly level programing.**
- •**Technician hardware checkout, P. C. Board and documentation experience required.**
- •**Draftsperson at least 3 years P. C. Board, layout/ tape-up, logic diagram or assembly background necessary.**

Telefile is the right company at the right time and the right place for the exceptional applicant

If the challenge of success is your goal, send your resume in complete confidence to.

D. E. White
Vice- President of Engineering
Telefile Computer Corporation
17131 Daimler Street,
Irvine, CA 92714
Equal Opportunity Employer M/F

CHECK PROCESSING MANAGER

Challenging position available with San Diego Data Processing Department of major California branch banking system.

Position is responsible for full second shift check processing cycle form in-distribution to fine sort. Applicant should have experience in managing proof, computer balancing, and reader/sorter capture operations. Equipment configurations consists of NCR 775, IBM 3890 hardware, and UCC POD software Salary $18-24K depending on experience. Excellent benefits program.

Please send resume including
salary history and requirements
in confidence to:

CALIFORNIA 1ST FIRST BANK

CALIFORNIA FIRST BANK
Data Processing
P.O. Box 2428
San Diego, Ca. 92112
Attn: C. Brown

Equal Opportunity Employer M/F

EDP SPECIALISTS

Nationwide

• **Director** NYC location	**To $50K**
• **EDP Manager** Pennsylvania location	**To $35K**
• **Data Centr Mgr** Midwest location. OS	**To $27K**
• **Sr Analyst** M.W. O/E, SLS Accts	**To $26K**

Fees assumed by client co's

LESLIE. KAVANAGH
505 5th Av, NY, NY 10017
(212) 661-0670 (agency)
Corporate Inquiries Welcome

UTILITY EXPERIENCE - BACKGROUND

CIBER has immediate and future openings for:

PROJECT MANAGERS
SYSTEMS ANALYSTS

We are looking for capable individuals to augment our Utilities application staff. The skills required include:

- Large Mainframe experience on IBM, Burroughs, Honeywell
- Varied utility applications experience particularly Customer Billing application
- Five or more years directing or systems design experience in developing major utility applications
- Structured design and programming methodology

CIBER offers our employees the opportunity to develop - to grow - to expand their knowledge in new and varied atmospheres.

In addition, we provide paid vactions, paid holidays, incentive compensation, scheduled reviews and meritorious salary increases. Our benefits plan (fully paid) is a model for the EDP service industry.

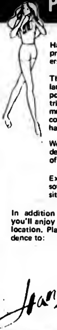
Call or forward your resume today to:

30400 Telegraph Road
Suite 308
Bingham Farms, MI 48010
(313) 642-2800

1777 W. Camelback Road
Suite M-108
Phoenix, AZ 85013
(602) 248-0013

CIBER *We Are an Equal Opportunity Employer M/F*

PROGRAMMER ANALYSTS SYSTEMS ANALYSTS PROJECT LEADERS



Hanes Hosiery, Inc. has challenging positions open for programmer/analysts, systems analysts and project leaders.

These positions offer involvement wtih a sophisticated large-scale Honeywell computer environment featuring powerful on-line program development software, distributed processing on minicomputers, data base management systems, and transaction processing software. Our company is committed to the utilization of state-of-theart hardware and software facilities.

We seek creative individuals with proven abilities in the development of application programs, planning and design of business systems, and systems project management.

Experience with utilization of Honeywell large system software will be a definite advantage but not a prerequisite for each of these positions.

In addition to an attractive salary and liberal benefits package, you'll enjoy the advantages of living in a mild, sunny, southeastern location. Please send resume with complete salary history in confidence to:

Hanes

Management Recruitment Coordinator
Personnel Department/Systems
Hanes Hosiery, Inc.
P.O. Box 1413
Winston-Salem, N.C. 27102

An Affirmative Action Employer

SYSTEMS ANALYSIS

Work includes design of Fire Control and Command & Control Systems for attack submarines. Realtime assembly language programming experience required. Exposure to AN/UYK-7, 20 CS-1, CMS-2 or ULTRA 32 desired.

Systems Consultants, Inc. is a national systems engineering firm headquartered in Washington, D.C. These positions are located in Newport, R.I., a unique small community offering vast recreational and cultural opportunities.

In addition to interesting assignments, we offer competitive starting salaries, fringe benefits and relocation expenses.

If you qualify, please send resume to:

Newport Division
SYSTEMS CONSULTANTS INC.
10 John Clarke Road
Middletown, RI 02840

SCI
SYSTEMS CONSULTANTS INC

An Equal Opportunity Employer

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mini-computer programmer opportunity

If you are interested in:

Mini-Computer Manufacturing Applications
Interactive Transaction Processing
Data Base Management Systems

Teledyne Continental Motors Aircraft Products Division has an exceptional career opportunity for you. We are the leading manufacturer of internal combustion engines for the general aviation market. We are looking for a talented individual who has 0-2 years experience with a BS in Computer Science or related field.

We offer a competitive salary based on individual talent, education and experience, and an attractive fringe benefit package. For more information, please send a detailed letter or resume to: Ms. Lea Carroll

or call (205) 438-3411

TELEDYNE
CONTINENTAL MOTORS
Aircraft Products Division
P.O. Box 90
Mobile, Alabama 36601
An Equal Opportunity Employer M/F

SOFTWARE DEVELOPMENT

Unprecedented success in General Instrument Corporation's growing point of sale and legalized wagering terminal systems business in Hunt Valley, Maryland, has generated expanding requirements for software development and applications programmers.

We have immediate and continuing requirements for assembly and higher level language programmers with at least 2 years experience for real time, on line microcomputer applications. Ability to create, program, debug, install and troubleshoot software on PDP 11, Nova, Varian or similar minicomputer is important.

Qualified candidates are requested to call Don Parsons on our toll free number, (800) 638-6395, or submit resume in confidence to:

GENERAL INSTRUMENT CORPORATION
DATA SYSTEMS AND SERVICES GROUP
11126 McCORMICK ROAD HUNT VALLEY MARYLAND 21031
An Equal Opportunity Employer M/F

EXPERIENCED SYSTEMS PROGRAMMERS

We currently offer a limited number of ambitious programmers an opportunity to broaden their experience with one of the most advanced and sophisticated computer facilities in the country. Available positions are in the following areas:

- Telecommunication Software
- Real-time Systems
- Performance Measurement and Evaluation
- Minicomputers

To qualify, you must be experienced in large system support including SVS/MVS, HASP/JES2 and VM370. And have a BS or MS in Mathematics or Computer Science.

These openings are with New Englands largest employer and in a major division of a corporation high on the Fortune 500 listing. Thus, you will find salary levels and benefits at very desirable levels.

For an immediate consideration, send your resume (including salary progress) to Professional Recruitment, Office 124, Pratt & Whitney Aircraft Group, East Hartford, Ct. 06108.

PRATT & WHITNEY
AIRCRAFT GROUP
UNITED TECHNOLOGIES

An Equal Opportunity Employer
Male and Female

SENIOR SYSTEMS ANALYST

Excellent professional opportunity at West Virginia University in analyzing and designing administrative systems. Bachelor's Degree in a related field or equivalent experience. Work experience in systems design and analysis of financial systems. Thorough knowledge of business computer programming. Competitive salary and benefits. Forward resume along with salary history to: Mr. E.J. Podaszwa, Personnel Officer, West Virginia University, Morgantown, West Virginia 26506. Please apply by September 30, 1977. An Equal Opportunity/Affirmative Action Employer M/F.

SOFTWARE DEVELOPMENT PROGRAMMERS

IMS-On-Line, Jr. and Intermediate level; Cobol-OS on banking and insurance system, manufacturing systems-to $700 per week. Some over-seas (permanent) and western regional openings.

BRANCH RECRUITING MANAGERS

If you have 2 or more years in professional recruiting of D.P. personnel and your career needs a boost, call us regarding our expansion program. AZ, No. CA, and So. CA Openings.

SIGMATICS, C9A, J.A. Cummines, 2062 Business Center Drive, Ste. 215, Irvine, Calif. 92715 (714) 633-1143, (408) 246-6940 or (802) 266-0466.

Regional Manager

Pittsburgh Office

Must have ability to manage a remote computing marketing profit center. A total professional, exp. in applying computer languages and services to client applications. Able to direct other professionals and interface with clients at the highest levels.

Experienced DEC-10 Operator

Braintree, Corp. Headquarters

Must have ambition, flexibility and capability to interface with clients.

Excellent salary and total benefit package plus bonus plan.

Please send resume to Mr. Robert Hanlon.

Interactive Sciences Corporation
60 Brooks Drive
Braintree, Ma. 02184

NETWORK ANALYST

Our Corporate Data Processing Center located in Fullerton, California, has an immediate opening for an experienced Network Analyst. Position responsibilities include participation in the design and implementation of a packet switching network initially consisting of three nodes and ultimately five, with emphasis in the front and end processor area. This network will be implemented to serve the needs of all Hughes Aircraft users and will provide access to the following systems:

- AMDAHL 470/6
- IBM S/370-165, 158, 148, 115
- DEC System/10
- Many Minicomputers

Required background should include:

- Experience with either COMTEN or CCI front end communication control units
- Bachelor's degree in a technical discipline
- Experience with IBM or AMDAHL host computer systems
- Demonstrated ability to communicate and prepare "completed staff work."

Qualified applicants should send their resumes to: Ground Systems Group, Employment Dept. O, P.O. Box 3310, Fullerton, CA 92634.

HUGHES
HUGHES AIRCRAFT COMPANY

U.S. citizenship required • Equal opportunity M/F/HC employer

MANUFACTURING SYSTEM ANALYSTS

NCR is now involved in the development of an integrated, on-line Manufacturing Control System for use both in our manufacturing divisions and for sale to our customers. The system will address the following application areas:

BILL OF MATERIAL
STORES CONTROL
INVENTORY MANAGEMENT
STANDARD COST
ROUTING
WORK-IN-PROCESS
PLANNED ORDER RELEASE
MATERIAL REQUIREMENTS PLANNING

This development effort has created opportunities in the following area:

SYSTEMS ANALYST/PROGRAMMERS

Major emphasis will be to prepare the system application software and documentation for external release for use on NCR's new Criterion computer line. To qualify the candidates' background should include 3-5 years systems and programming experience using COBOL in one or more of the above application areas. Ideally that experience will also include the use of data base and on-line processing.

The ideal candidates will have a bachelor's degree in an appropriate discipline.

To arrange for local interviews, send your resume to:

NCR

Mr. Vernon L. Mirre
Corporate Executive &
Professional Recruitment
NCR Corporation
Dayton, Ohio 45479

An Equal Opportunity Employer

---

computer hardware and software candidates... RELAX

We have scores of openings in all parts of the U.S. Our fees are paid by hiring companies anxious to find qualified computer hardware and software candidates. Contact the nearest office for confidential service and let us do the footwork.

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4600 El Camino Real, Suite 206
Los Altos, CA. 94022
(415) 941-3200

MIDWEST PERSONNEL CONSULTANTS, INC.
3011 Washington Ave., Suite 104
Evansville, IND. 47715
(812) 477-5531

PERSONNEL INC.
Charlene Dattoli
838 National Road
Wheeling, W.V. 26003
(304) 233-3000

AVAILABILITY, INC.
Data Services Consultants
5401 W. Kennedy Blvd., Suite 285
Tampa, Florida 33609
(813) 872-2631

COMPUTER CAREERS INC.
Specialists - Data Processing
4720 Montgomery Lane, Suite 583
Bethesda, Maryland 20014
(301) 654-9225

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San Francisco, CA. 94111
(415) 986-6700

members of
National Personnel Associates
specializing in DP

COMPUTER PROFESSIONALS

M.I.S. INTERNATIONAL, INC. — an internationally known computer systems integration organization — requires specialized professionals for top assignments in our Michigan and Indiana branches.

Knowledge of the following computers is desirable:

- **Real Time Analysts/Programmers with experience in Micro/Mini-Computers: DEC, ModComp, T.I. 990**
- **Business Systems Analysts/Programmers with experience in COBOL/PL-1 on IBM, Burroughs, and Honeywell mainframe computers.**
- **Data Base Management Analysts/Programmers with experience in IMS, DMS-11, IDS.**

Experienced men and women interested in furthering their career should consider M.I.S.'s top salary structure, stable employment environment, fully-paid fringe benefits, educational opportunities and relocation allowances. You are invited to send your resume to Mrs. M. Roseliep

M.I.S. INTERNATIONAL, INC.
31350 Smith Road
Romulus, Michigan 48174
(313) 326-7010

Scientific Computing Consultant

Our Corporate Computing Center has an opening for a scientific computing consultant. Major responsibilities will consist of providing programming and debugging assistance to scientific computer users, conducting seminars and short courses in FORTRAN, JCL and other programming subjects. Other duties will include writing user documentation and participating in software product evaluation and software quality assurance testing.

A Bachelor's degree in mathematics, computer science or in a related scientific field is mandatory. Experience in scientific programming with extensive knowledge of FORTRAN and OS or VS JCL, teaching experience, good communication skills, and an ability to work well with people are essential.

Qualified applicants should send their resume to: Ground Systems Group, Dept. B, P.O. Box 3310, Fullerton, CA 92634.

HUGHES
HUGHES AIRCRAFT COMPANY

U.S. CITIZENSHIP REQUIRED
Equal Opportunity M/F/MC Employer

INSTALLATION CONSULTANT

Analytical, affable person needed as consultant for broadcasting stations installing D.P. systems. General BA or BS degree required. Must have 4 years experience in broadcasting and 2 years in D.P. 25% travel, basic 40 hrs/wk, $1300/month. Exc. benefits and working conditions. Apply to nearest Colorado Job Service for referral. Columbine Systems, Inc.

ILLINOIS BOARD OF HIGHER EDUCATION

COMPUTER PROGRAMMER

Immediate opening — position requires experience with scientific software packages. Self-sufficiency in data processing systems design required. Must hold at least a Bachelor's degree. Salary up to mid-teens, depending on experience and qualifications.

For confidential attention and a more detailed job description, please send resume by October 1, 1977 to:

Paul E. Lingenfelter
Illinois Board of Higher Education
500 Reisch Building
4 West Old Capital Square
Springfield, Illinois 62701
An Equal Opportunity/ Affirmative Action Employer

SYSTEMS ANALYST/ PROGRAMMER V.

Central Washington University has openings for two senior level positions with project lead responsibilities in major applications areas. Interactive PDP 11/45 and remote IBM S/370's support site. CWU is a pioneer in large scale networking and local interactive mini support for on-line student registration.

Salary range $1550-$1984 monthly, with good fringe benefits.

Applications will be accepted until September 30, 1977.

Contact Don Clark
Director Computer Services
CWU, (509) 963-2821
EEO/AA/Title IX Institution

CDC SYSTEMS PROGRAMMERS

We need people with one to three years experience in NOS, KRONOS, SCOPE, or NOSBE internals. Our clients offer excellent career paths, outstanding work environment and starting salaries of $18 to $24K.

Call collect now for more information.

David Oldfield, EDP Search
2401 NW 39th Expressway
Oklahoma City, OK 73112
(405) 525-8833

SR. BUSINESS SYSTEMS PLANNER

Continuing emphasis on profit maximization throughout corporate and divisional management has created an exceptional opportunity for a systems professional who can provide leadership in the planning and development of advanced business systems. For consideration, you'll need an MBA or an MS and a good understanding of financial and economic theory as it applies to overall profits. Four or more years background in project management experience that demonstrates accomplishments in planning, developing and implementing on line as well as batch systems with large scale and mini-computers in the areas of manufacturing, order entry, inventory control, purchasing, accounts payable and general ledger is also necessary. Send resume in strictest confidence to: M. Tomaszewski, Dept. 5722

BORDEN

BORDEN INC.
180 E. Broad St.
Columbus, Ohio 43215

An Equal Opportunity Employer M/F

Data Processing

OPPORTUNITIES IN WESTERN MICHIGAN

DATA PROCESSING

Teledyne Continental Motors, General Products Division is dedicated to the concept of a totally new manufacturing control system and we presently need several professionals to help us to attain and maintain our goal.

We are a major producer of diesel engines and have a number of challenging opportunities for qualified individuals to join our data processing group. The following positions are available:

SYSTEM ANALYSTS

Must have several years of solid manufacturing data base systems experience and appropriate degree is highly desirable.

PROGRAMMERS

Must have 3-5 years programming background with COBOL and data base experience in a manufacturing environment.

We offer challenging projects and career opportunities located in the heart of Lake Michigan vacationland. Excellent salary and benefit program are available. For confidential consideration submit your resume with salary requirements or call collect.

Jim Riegler (616) 724-2846

TELEDYNE
CONTINENTAL MOTORS
GENERAL PRODUCTS DIVISION
76 Getty St., Muskegon, Michigan 49442
An Equal Opportunity Employer M/F

programmer/ analyst

Creative System Applications

If you seek a more varied and creative data processing environment in which to apply your OS/COBOL experience, you'll find stimulating career challenges are yours at our suburban Chicago subsidiary of a major "Fortune 500" company.

Position requires an individual with a minimum of two years OS/COBOL Programmer/Analyst experience, capable of communicating effectively with clients to resolve their varied data processing objectives. Excellent written and verbal skills a must.

For confidential consideration, forward resume detailing salary history, in confidence to:

CW Box 3152
797 Washington St.
Newton, Mass. 02160

An Equal Opportunity Employer M/F

Corporate Systems Development

Due to increased growth within the company, demanding positions are open in the following areas:

Business Systems Applications— Project Manager

To provide leadership, planning and coordination between interorganizational groups in the design of business application systems which support corporate MIS needs. Ability to identify logical system alternatives, forecast impact and communicate effectively with multi-corporate levels. Six to eight years D.P. experience with emphasis in systems analysis and project management. Degree in computer science/business is desired.

System Planning Analyst

Participate in all phases of a long range strategic systems development plan for business applications. Multi-corporate level interaction requires comprehensive understanding of business activities. Communication skills must be highly competent. Requires extensive experience in strategic planning, systems development and installation; MBA with computer science or equivalent experience.

Systems Analyst

Develop business application systems utilizing advanced computer technology to achieve management information capabilities and requirements. Interaction with interorganizational groups requires effective communication skills. Requires extensive experience in systems design, development and installation; BS in computer science with business minor or equivalent experience.

Tektronix, Inc. develops, manufactures and markets internationally recognized precision electronic measurement instruments, computer peripherals and related electronic instrumentation. Located near Portland, Oregon we are within a two hour drive of the Cascade Mountains and Ocean Beaches. The close-by nature playgrounds and the City of Portland provide a variety of recreational and cultural interests.

Salary is open. Benefits include educational support, insurance and profit sharing programs.

Please send complete resume and salary history to Larry Green, TEKTRONIX, INC., P.O. Box 500, C59, Beaverton OR 97077.

An Equal Opportunity Employer M/F/HC.

Tektronix
COMMITTED TO EXCELLENCE

MINI CONFIGURATION SPECIALIST

Software/Hardware

$32,000 to $36,000

Exeter Associates.

P.O. Box 623, Computer Park
Hampton, N.H. 03842
(603) 926-6712

FIELD SERVICE

SYSTEMS	370/360, H-200, XDS, Univac, CDC All Large & Medium CPU's
MINI's	PDP, NOVA, G.A., HP, etc. All Mini Systems
I/O	STC, TELEX, CDC, ITEL, CALCOMP, etc. All Peripheral Experience

MTTR

(312) 547-6682
MTTR ASSOCIATES
1107 Mannheim Road $12-24K
Westchester, Ill. 60153

Field Service Specialist
Nationwide Placement-
Private Employment Agency
No Fees To Applicants

B 6700 SYSTEM SOFTWARE SPECIALIST

Dynamic Central Florida installation requires an individual with minimum 4 years Burroughs large system experience including "Algol" and at least 2 years Datacom and/or DMS II experience. Send resume in confidence to - Florida S&L Services, Inc., P.O. Box 1547, Orlando, FL 32802. *Equal Opportunity Employer*

PROGRAMMER ANALYST

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Miami, Florida 331NN

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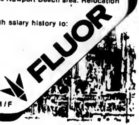

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If you have most of the above qualifications, contact Roxie J. O'Brien, Senior Employment Coordinator, Portland General Electric Company, 121 S.W. Salmon, Portland, OR 97204.

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PGE
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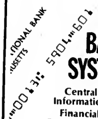

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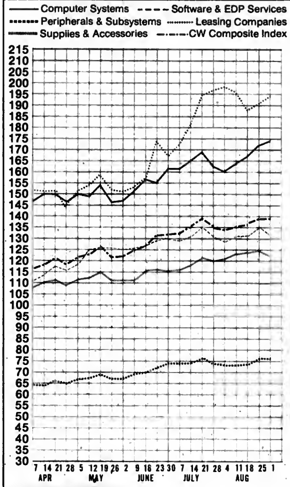

Earnings Reports

ANDERSON JACOBSON
Three Months Ended June 30

	1977	1976
Shr Ernd	$.13	$.10
Revenue	6,046,000	4,741,000
Earnings	301,000	234,000

CAMBRIDGE MEMORIES
Three Months Ended May 28

	1977	1976
Shr Ernd	$.59	($1.11)
Revenue	1,840,000	8,799,000
Tax Cred	115,000	.....
Earnings	994,000	(1,880,000)
6 Mo Shr	2.37	(1.46)
Revenue	8,403,000	17,356,000
Tax Cred	342,000	.....
Earnings	4,022,000	(2,484,000)

CENTRONICS
Year Ended June 30

	1977	1976
Shr Ernd	$2.08	$1.82
Revenue	56,100,000	52,176,633
Earnings	12,850,000	6,763,815

COMPUTER TRANSCEIVER SYSTEMS
Three Months Ended May 31

	1977	1976
Shr Ernd	$.11	$.06
Revenue	1,255,476	835,064
Earnings	103,732	80,704

COMPUTERVISION
Three Months Ended June 30

	1977	1976
Shr Ernd	$.27	$.12
Revenue	11,308,000	7,892,000
Earnings	643,000	282,000
6 Mo Shr	.48	.18
Revenue	21,805,000	14,460,000
Earnings	1,137,000	387,000

COMSHARE
Year Ended June 30

	1977	1976
Shr Ernd	$1.30	$.85
Revenue	18,212,700	13,767,800
Earnings	2,018,800	1,172,500
3 Mo Shr	.31	.13
Revenue	5,237,300	3,542,100
Earnings	828,800	194,900

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TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, AUGUST 31, 1977

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE AUG 31 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	22- 44	40 1/4	-3 1/4	-7.4
N	BURROUGHS CORP	55- 91	71 1/4	+ 5/8	+0.8
O	COMPUTER AUTOMATION	18- 30	28 5/8	+ 3/4	+2.6
N	CONTROL DATA CORP	20- 26	21 1/4	+ 1/2	+2.4
O	CRAY RESEARCH INC	15- 28	27 3/4	+1 1/4	+4.7
N	DATA GENERAL CORP	35- 51	48 5/8	- 3/8	-0.7
N	DATAPOINT CORP	18- 32	31 1/2	+2 7/8	+10.0
N	DIGITAL EQUIPMENT	37- 53	48 1/8	0	0.0
N	ELECTRONIC ASSOC.	2- 3	1 7/8	0	0.0
A	ELECTRONIC ENGINEER.	8- 10	10	+ 1/2	+5.2
O	FOUR-PHASE SYSTEMS	13- 18	16 3/4	- 5/8	-3.5
N	FOXBORO	42- 54	47 1/4	-1 1/4	-2.5
O	GENERAL AUTOMATION	6- 9	8 1/8	+ 7/8	+12.0
O	GRI COMPUTER CORP	1- 1	1/2	0	0.0
N	HEWLETT-PACKARD CO	69- 87	79 1/4	+ 1/2	+0.8
N	HONEYWELL INC	44- 55	48	-1 3/4	-3.5
N	IBM	245-288	268 3/8	+ 3/8	+0.1
O	MANAGEMENT ASSIST	5- 8	6 5/8	+ 1/8	+1.9
N	MEMOREX	23- 33	32 3/8	-1	-2.9
O	MICRODATA CORP	7- 16	14	+2 1/8	+17.8
O	MODULAR COMPUTER SYS	5- 8	7 1/2	- 1/2	-6.2
N	NCR	32- 47	45 1/8	+ 1/4	+0.5
O	PRIME COMPUTER INC	12- 20	20 1/4	+ 3/4	+3.8
N	PERKIN-ELMER	17- 22	20 3/8	+ 1/4	+1.2
N	RAYTHEON CO	16- 33	28 3/4	+ 1/2	+1.7
N	SPERRY RAND	34- 42	35 1/2	-1 1/8	-3.0
O	SYCOR INC	8- 15	10 7/8	+ 5/8	+6.0
A	SYSTEMS ENG. LABS	5- 8	7	- 1/4	-3.4
A	WANG LABS.	10- 21	12 1/2	-1 3/4	-12.2

LEASING COMPANIES

EXCH		PRICE 1977 RANGE (1)	CLOSE AUG 31 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 5	4	- 1/8	-3.0
O	BOOTHE COURIER CORP	8- 10	11 1/4	+ 1/4	+2.2
O	CONDISCO INC	10- 13	11	0	0.0
A	COMMERCE GROUP CORP	2- 2	1 7/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	7/8	+	+7.8
M	DATRONIC RENTAL	0- 2	1 1/8	0	0.0
A	DCL INC	1- 2	2 1/8	0	0.0
N	DPF INC	8- 9	9 1/4	+1 3/8	+17.4
N	ITEL	13- 22	21 3/8	+ 1/2	+2.3
N	LEASCO CORP	19- 27	24	-1 3/8	-5.4
O	LEASPAC CORP	1- 2	1	0	0.0
O	NRG INC	1- 1	1/8	0	0.0
A	PIONEER TEX CORP	5- 11	5 5/8	- 1/8	-2.1
N	U.S. LEASING	10- 15	14	- 1/8	-0.8

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
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SOFTWARE & EDP SERVICES

EXCH		PRICE 1977 RANGE (1)	CLOSE AUG 31 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	7/8	0	0.0
O	ANACOMP INC	7- 10	8 7/8	0	0.0
A	APPLIED DATA RES.	5- 10	8	- 3/4	-8.5
N	AUTOMATIC DATA PROC	23- 30	27	-1 1/4	-4.4
O	COLEMAN AMERICAN COS	2- 2	2	0	0.0
O	COMPU-SERV NETWORK	10- 15	12	0	0.0
O	COMP ELECTION SYSTMS	8- 10	9	- 5/8	-6.4
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	8- 10	8 7/8	- 1/8	-1.3
N	COMPUTER SCIENCES	7- 9	8 3/4	0	0.0
O	COMPUTER TASK GROUP	1- 2	2	0	0.0
O	COMPUTER USAGE	1- 3	1 1/2	0	0.0
O	COMSHARE	5- 7	6	0	0.0
O	DATA DIMENSIONS INC	3- 5	3 3/8	0	0.0
O	DATATAB	1- 2	1 1/2	- 1/4	-14.2
N	ELECTRONIC DATA SYS.	16- 20	17 1/2	- 1/8	-0.7
O	INSYTE CORP	2- 3	1 5/8	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 1/2	0	0.0
O	KEANE ASSOCIATES	3- 4	3 3/4	0	0.0
O	KEYDATA CORP	2- 3	1 7/8	+ 1/4	+15.3
A	LOGICON	7- 17	12 1/8	-1 1/8	-6.4
A	MANAGEMENT DATA	1- 2	1 7/8	+ 1/4	+15.3
A	NATIONAL CSS INC	19- 26	25	- 1/4	-0.9
O	NATIONAL DATA CORP	4- 7	5 3/8	- 1/8	-2.2
A	ON LINE SYSTEMS INC	17- 22	17 3/8	- 7/8	-4.7
N	PLANNING RESEARCH	3- 6	5 1/2	+ 1/2	+10.0
O	PROGRAMMING & SYS	1- 1	3/8	- 1/8	-25.0
O	RAPIDATA INC	2- 3	2 5/8	- 1/8	-4.5
O	REYNOLDS & REYNOLDS	17- 20	18 1/4	0	0.0
O	SCIENTIFIC COMPUTERS	1- 3	4	+ 3/8	+10.3
O	TYMSHARE INC	14- 23	21 5/8	- 1/4	-1.1
A	URS SYSTEMS	4- 5	4 1/8	- 1/8	-2.5
N	WYLY CORP	1- 2	7/8	- 3/8	-30.0

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE AUG 31 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 15	13 7/8	0	0.0
O	ADVANCED MEMORY SYS	7- 9	7 1/2	0	0.0
N	AMPEX CORP	8- 11	10 1/2	+ 3/8	+3.7
O	ANDERSON JACOBSON	3- 5	3 7/8	- 1/8	-3.1
N	APPLIED DIG DATA SYS	10- 20	18 1/2	- 5/8	-3.2
O	BEEHIVE INT'L	8- 12	9 5/8	- 1/4	-2.5
A	BOLT,BERANEK & NEW	7- 8	7 1/4	- 1/8	-1.6
N	BUNKER-RAMO	8- 12	11	- 1/4	-2.2
A	CALCOMP	3- 5	2 7/8	0	0.0
O	CAMBRIDGE MEMORIES	1- 3	2 7/8	+ 1/2	+21.0
N	CENTRONICS DATA COMP	22- 30	30	+1 1/8	+3.8
O	COGNITRONICS	1- 1	5/8	0	0.0
O	COMPUTER COMMUN.	5- 6	6 7/8	+ 3/8	+5.7
O	COMPUTER CONSOLES	4- 7	4	- 1/4	-5.8
A	COMPUTER EQUIPMENT	2- 3	3	- 1/8	-4.0
O	COMPUTER TRANSCEIVER	1- 1	1 1/8	- 1/8	-10.0
O	COMTEN	9- 13	10 1/8	0	0.0
N	CONRAC CORP	19- 28	21 1/8	- 7/8	-3.9
O	DATA ACCESS SYSTEMS	4- 5	3 3/4	0	0.0
O	DATA 100	6- 9	7 1/4	- 1/4	-1.3
A	DATA PRODUCTS CORP	9- 18	14 7/8	+ 1/4	+1.7
O	DATA TECHNOLOGY	3- 4	4 1/4	0	0.0
O	DATUM INC	1- 2	1 5/8	+ 1/8	+8.3
O	DECISION DATA COMPUT	2- 3	2 1/4	0	0.0
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	4- 9	7 3/4	+ 3/8	+5.0
O	DATAKAR CORP.	2- 8	7 3/4	+ 1/4	+3.3
N	ELECTRONIC M & M	4- 5	4	- 1/8	-3.0
O	FABRI-TEK	1- 2	1	- 1/8	-11.1
O	GENERAL COMPUTER SYS	0- 2	1 1/4	0	0.0
N	HAZELTINE CORP	9- 12	8 7/8	+ 1/8	+1.4
N	HARRIS CORP	28- 39	36 5/8	+ 7/8	+2.4
A	INCOTERM CORP	10- 15	12	+ 5/8	+5.4
O	INFOREX INC	4- 7	4 3/8	- 1/8	-2.7
O	INFORMATION INTL INC	9- 14	12 1/4	+2	+19.5
O	INTEL CORP	38- 57	46 1/2	0	0.0
A	LUNDY ELECTRONICS	3- 8	4 1/8	- 1/4	-5.7
O	MSI DATA CORP	8- 12	10 3/8	- 3/8	-3.4
N	MOHAWK DATA SCI	5- 8	6 1/2	0	0.0
O	PENRIL CORP	2- 5	3 3/4	0	0.0
A	PERTEC CORP	7- 9	8 1/4	+ 1/4	+3.1
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	4- 5	3 7/8	+ 1/8	+3.3
O	RECOGNITION EQUIP	6- 10	8 3/8	+ 7/8	+11.6
O	SCAN DATA	1- 2	1 3/8	0	0.0
O	STORAGE TECHNOLOGY	10- 18	15 1/4	- 1/4	-1.8
O	T BAR INC	7- 12	11 5/8	- 1/8	-1.0
O	TALLY CORP.	4- 6	4 7/8	0	0.0
A	TEC INC	7- 10	7 7/8	- 1/8	-1.5
N	TEKTRONIX INC	29- 38	37	0	0.0
N	TELEX	2- 3	2 3/4	+ 1/8	+4.7
O	WILTEK INC	1- 1	5/8	- 1/8	-16.6

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977 RANGE (1)	CLOSE AUG 31 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 8	6 1/8	- 3/8	-5.7
O	BALTIMORE BUS FORMS	2- 4	2	+ 1/8	+8.8
A	BARRY WRIGHT	10- 14	13 5/8	- 5/8	-4.3
O	CYBERMATICS INC	1- 1	1	- 1/4	-20.0
O	CURLEX PRODUCTS INC	14- 19	17	- 1/2	-2.8
N	ENNIS BUS. FORMS	6- 7	5 7/8	- 1/8	-2.0
O	GRAHAM MAGNETICS	11- 17	16 1/2	+ 1/4	+1.5
O	GRAPHIC CONTROLS	15- 18	15 1/2	- 1/2	-3.1
N	3M COMPANY	48- 58	52 1/8	+ 5/8	+1.2
O	MOORE CORP LTD	26- 37	27 1/4	- 1/4	-0.9
N	NASHUA CORP	16- 27	25 1/8	- 3/8	-1.4
O	STANDARD REGISTER	18- 25	21	- 1/2	-2.3
O	TAB PRODUCTS CO	13- 19	16 1/2	- 3/4	-4.3
N	VARCO	19- 22	19 1/4	- 1/8	-0.6
A	WABASH MAGNETICS	10- 15	12	- 1/8	-1.0
N	WALLACE BUS FORMS	17- 21	18 3/8	0	0.0

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